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CONTENTS:

New England Panicum. *F. Lamson-Scribner and E. D. Merrill* 93
Maine Plants and their Uses. *J. M. H. Morrell* . . . 129
Notes on Algae, — III. *F. S. Collins* 132
Hybrids of Quercus ilicifolia. *Alfred Rehder* 137
Two Mushroom Books 140
Additions to the Flora of Connecticut. *H. J. Koehler* . . 144
Botrychium matricariaefolium on Mt. Toby. *T. O. Fuller* . 144
Correction regarding Barbarea praecox. *C. B. Graves* . . 145
Noteworthy Panicums in Connecticut. *A. W. Driggs* . . 145
Juniperus communis, var. erecta, in Massachusetts. *E. H. Terry* 146

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THE NEW ENGLAND BOTANICAL CLUB

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THE NEW ENGLAND SPECIES OF THE GENUS PANICUM.

F. LAMSON-SCRIBNER and ELMER D. MERRILL.

THE paper here presented on the "New England Species of the Genus Panicum" is based almost entirely upon material loaned by the New England Botanical Club, the Gray Herbarium and a number of individuals whose names are given whenever their specimens are cited. Much of the value of the paper rests upon the fact that the great number of localities given, indicates very fully the distribution of the species enumerated.

In spite of the length of time which the authors have had for the preparation of this synopsis and the ample material with which they have been so kindly supplied by many New England botanists, the work is far from perfect and probably no one will realize this more fully than do the authors themselves. We can never come to a satisfactory conclusion in regard to the limitations of certain of the species now recognized in the group which contains *Panicum dichotomum* and in fact, the authors in preparing this paper have not always agreed on the limitations of certain species and varieties. It is possible that the examination of the herbaria of some of the older authors may clear up some of the doubtfully identified species, but we are not sure that this would be the result as these authors very frequently had an imperfect conception of specific limits in this group and their type or so-called type material is apt to consist of heterogeneous collections which later botanists regard as distinct species. In no case is this more likely to occur than in the species which we have here taken up under the name of *Panicum unciphyllum* Trin., the limitations of which are very doubtful indeed, and this species of Trinius

has been taken up as appearing to afford the best solution of a difficulty which the authors had to meet.

Hoping that the efforts here presented will be of some service to our New England friends, it is offered to them with the plea that they will exercise a measure of charity towards the imperfections which may appear.

Panicum Linn. Sp. Pl. 55. 1753.

Spikelets 1-flowered or sometimes with a staminate flower below the hermaphrodite terminal one, in spikes, racemes, or panicles. Glumes four, the first usually much shorter than the others, very rarely wanting (some species of the section *Syntherisma*); second glume empty, equaling or somewhat shorter than the third, which is empty or has a palea or even a staminate flower in its axil; fourth glume usually smooth and shining, coriaceous, much firmer in texture than the others. Palea similar in texture to its glume and closely embraced by it. Grain inclosed within the hardened fruiting glume and palea, free — Annuals or perennials, varying greatly in habit of growth, foliage and inflorescence.

Species about 400, throughout the tropical and subtropical regions of both hemispheres, a few only in the temperate regions. Several species are cosmopolitan and appear as weeds throughout all civilized countries. About 150 species and varieties are now recognized as occurring within the United States, while 35 species and 5 varieties and forms are recorded in the present paper, as growing in New England.

For convenience in classification the following sections are recognized:

§ I. Syntherisma Walt. Fl. Carol. 76. 1788. (as a genus) (*Digitaria* Scop. Fl. Carn. ed. 2, 2 : 52. 1772, not Heist. 1763.) Spikelets borne in pairs, one sessile, and one pedicellate, in simple, slender, one-sided racemes, which are digitate or fasiculate at the summit of the culm; glumes four, sometimes three, by suppression of the first one. This section is intermediate between *Panicum* and *Paspalum* (Page 98).

1. P. filiforme Linn.
2. P. sanguinale Linn.
3. P. humifusum (Pers.) Kth.

§ II. EUPANICUM Benth. in Benth. & Hook. Gen. Pl. 3: 1102. 1883. Spikelets awnless, all pedicellate in panicles, the branches of which are single or fascicled, generally much branched, usually naked below, spreading, or sometimes erect.

A. Basal and culm leaves similar in shape; spikelets acute or acuminate. HOMOPHYLLA (Page 101).

(*a*) Primary branches of the panicle spreading, the secondary ones appressed, rather densely flowered, spikelets 3 mm. long (*Excelsa* Bentham).

4. P. agrostoides Spreng. 5. P. longifolium Torr.

(*b*) Panicles strict; branches appressed; spikelets 5 to 6 mm. long.

6. P. amaroides Scribn. & Merrill

(*c*) Panicles diffuse.

7. P. virgatum Linn.
8. P. verrucosum Muhl.
9. P. proliferum Lam.
10. P. capillare Linn.
11. P. minimum (Engel.) Scribn. & Merrill.
12 P. miliaceum Linn.

B. Basal leaves different in shape and much shorter than those of the culm, leaves of the branches smaller and more crowded than those of the primary stem; spikelets usually obtuse or abruptly acute. (*Panicum depauperatum* excepted) HETEROPHYLLA (Page 107).

13. P. depauperatum Muhl.
14. P. linearifolium Scribn.
15. P. xanthophysum A. Gray,
16. P. clandestinum Linn.
17. P. macrocarpon Le Conte.
18. P. latifolium Linn.
19. P. scribnerianum Nash.
20. P. barbulatum Michx.
21. P. mattamusketense Ashe,
22. P. dichotomum Linn.
23. P. bicknellii Nash.
24. P. commutatum R. & S.
25. P. boreale Nash.
26. P. werneri Scribn.
27. P. nitidum Lam.
28. P. clutei Nash.
29. P. sphaerocarpon Ell.
30. P. atlanticum Nash.
31. P. unciphyllum Trin.
32. P. lanuginosum Ell.
33. P. columbianum Scribn.

§ III. ECHINOCHLOA Beauv. Agrost. 53. *t. 11.* 1812. (as a genus).— Spikelets sessile or short pedicellate, densely imbricate in thick three to four ranked racemes, which are alternate on the common rachis, second and third glumes muricate-hispid, very acute, or generally bearing a long scabrous awn. (Page 126.)

34. P. crus-galli Linn. 35. P. walteri Pursh.

ANALYTICAL KEY TO THE SPECIES.

1. Spikelets in one-sided, usually simple racemes 2
1. Spikelets variously paniculate 6
2. Racemes slender, digitate or sub-fasciculate, outer glumes pubescent. 3
2. Racemes thick and racemed along the main axis, outer glumes muricate-hispid 5
3. Rachis of the racemes triangular, the angles naked, not winged; spikes very slender . . . . . 1. P. FILIFORME.
3. Rachis of the racemes flattened with the lateral angles broadly winged 4
4. Spikelets about 3 mm. long; second glume one-half as long as the spikelet . . . . . 2. P. SANGUINALE
4. Spikelets about 2 mm. long; second glume about equaling the spikelet . . . . . 3 P. HUMIFUSUM
5. Sheaths glabrous, flowering glume ovate, abruptly pointed 34. P. CRUS-GALLI
5. Sheaths hispid; flowering glume ovate-lanceolate, acuminate 35. P. WALTERI
6. Leaves all alike, spikelets acute (*Homophylla*). 7
6. Leaves dissimilar, basal ones shorter and broader than those above; leaves of the branches usually much smaller and more crowded than those of the primary stem; spikelets abruptly acute or obtuse (*P. depauperatum* excepted) (*Heterophylla*) 15
7. Spikelets 1.5 to 3 mm. long 8
7. Spikelets 4 to 6 mm. long 13
8. Panicles ovoid or oblong; primary branches spreading or ascending; secondary branches appressed. Perennials 9
8. Panicles ovate, often as broad as long, their slender few-flowered branches widely spreading. Annuals or perennials 10
9. Culms stout, much branched; secondary branches of the panicle densely flowered; lateral panicles numerous; spikelets 1.5 mm. long, rather blunt; ligule naked . . . . . 4. P. AGROSTOIDES
9. Culms slender, simple; secondary branches of the panicle few-flowered; lateral panicles usually wanting or occasionally one; spikelets very acute, 2 mm. long; ligule ciliate. . . . 5. P. LONGIFOLIUM
10. Sheaths glabrous 11
10. Sheaths papillose-pubescent 12
11. Outer glumes warty-roughened (verrucose) . . . 8. P. VERRUCOSUM
11. Outer glumes smooth; first glume broadly obtuse . 9. P. PROLIFERUM
12. Culms stout, finally much branched throughout, spikelets very acute, 2.5 mm. long, solitary . . . . . 10. P. CAPILLARE
12. Culms slender, branched only at the base; spikelets rather blunt, 2 mm. long or less, usually in pairs . . . . 11. P. MINIMUM
13. Annual; sheaths hispid . . . . . 12. P. MILIACEUM
13. Perennial; sheaths glabrous 14
14. Panicle very narrow, contracted; spikelets 5 to 6 mm. long 6. P. AMAROIDES

14. Panicle diffuse; spikelets 4 to 4.5 mm. long . . 7. P. VIRGATUM
15. Culm leaves erect, linear, often involute 16
15. Culm leaves lanceolate or linear-lanceolate, rounded, truncate, or clasping at the base, generally spreading 17
16. Spikelets about 3.5 mm. long, acute or acuminate 13. P. DEPAUPERATUM
16. Spikelets 2 to 2.5 mm. long, obtuse . . . 14. P. LINEARIFOLIUM
17. Spikelets 3 to 5 mm. long 18
17. Spikelets 2.5, rarely 3 mm. long, or less 22
18. Panicles strict, narrow, the branches erect; leaves erect 15. P. XANTHOPHYSUM
18. Panicles ovate, open, the branches spreading; leaves spreading or ascending 19
19. Leaf-blades ample, 2 to 3 cm. broad, cordate and clasping at the base 20
19. Leaf-blades smaller about 1 cm. broad, not clasping at the base 19. P. SCRIBNERIANUM
20. Sheaths papillose-hispid; spikelets 2.5 to 3 mm. long; panicles generally much included within the leaf-sheath, sometimes long-exserted 16. P. CLANDESTINUM
20. Sheaths glabrous or soft pubescent; spikelets 3 to 5 mm. long . 21
21. Nodes strongly bearded; sheaths and leaves generally soft-pubescent, sometimes nearly glabrous; spikelets 4 to 5 mm. long 18. P. LATIFOLIUM
21. Nodes naked; sheaths and surface of the leaves glabrous; spikelets 3 to 4 mm. long . . . . . 17. P. MACROCARPON
22. Whole plant nearly glabrous, nodes sometimes bearded; spikelets glabrous or pubescent 23
22. Whole plant more or less pubescent 31
23. Nodes bearded 24
23. Nodes naked or only with a few spreading hairs 25
24. Spikelets 1.5 mm. long, glabrous . . . 20. P. BARBULATUM
24. Spikelets 2.2. mm. long, pubescent . . 21. P. MATTAMUSKETENSE
25. Spikelets glabrous, 2 mm. long . . . . 22. P. DICHOTOMUM
25. Spikelets pubescent 26
26. Leaf-blades cordate-clasping at the base; spikelets nearly spherical; ligule obsolete . . . . . 29. P. SPHAEROCARPON
26. Leaf-blades not cordate-clasping at the base, spikelets ovate or elliptical; ligule present 27
27. Spikelets 2 mm. long or more 28
27. Spikelets 1.5 mm. long . . . . . 27. P. NITIDUM
28. Lower internodes of the culm puberulent; spikelets 2.5–3 mm. long (*P. bicknellii* may be looked for here) . . 24. P. COMMUTATUM
28. Lower internodes glabrous 29
29. Leaves spreading, rather rigid; spikelets 2.3 mm. long 28. P. CLUTEI
29. Leaves erect, rather soft; spikelets 2 mm. long 30
30. Leaves 8–15 mm. wide . . . . . 25. P. BOREALE
30. Leaves 3–6 mm. wide . . . . . 26. P. WERNERI
31. Spikelets 2 mm. long or more 32

31. Spikelets less than 2 mm. long 34
32. Plant pilose-pubescent throughout with long, spreading white hairs 30. P. ATLANTICUM
32. Plant not pilose-pubescent 33
33. Culms glabrous; spikelets 2 mm. long . . . 26. P. WERNERI
33. Culms puberulent, at least below; spikelets 2.5–3 mm. long 23. P. BICKNELLII
34. Culms appressed-pubescent or puberulent . 33. P. COLUMBIANUM
34. Culms with spreading pubescence 35
35. Leaves, firm and usually rigid; panicle usually purplish, branches rather rigid . . . . . 31. P. UNCIPHYLLUM
35. Leaves thin, with a peculiar lustre; panicle green, rather densely flowered, branches capillary and flexuose 32. P. LANUGINOSUM

§ I. SYNTHERISMA.

Spikelets borne in pairs, one sessile and one pedicellate, in simple, slender, one-sided racemes, which are digitate or fasciculate at the summit of the culm; glumes four, sometimes three by suppression of the first one.

* Rachis three-angled, not winged.

1. PANICUM FILIFORME Linn. Sp. Pl. 57. 1753. (*Digitaria filiformis* Muhl. Descr. 131. 1817; *Syntherisma filiformis* Nash, Bul. Torr. Bot. Club, **22**: 420. 1895.

A slender, simple or somewhat branched, annual, 1.5 to 7 dm. high, with long-exserted panicles of 2 to 5 slender, erect or ascending racemes, 2–10 cm. long. Sheaths flattened, keeled, papillose-hirsute; ligule a scarious irregularly toothed ring 1–2 mm. long; leaf-blades 3–20 cm. long, 1–4 mm. wide, erect, usually glabrous on the lower surface, the upper surface and margins rough, papillose-hirsute at the base. Racemes alternate, the rachis 3-angled, the angles hispidulous. Spikelets in pairs, about 1.8 mm. long, elliptic, acute, on hispidulous 3-angled pedicels; first glume obsolete; second glume about three fourths as long as the spikelet, 3-nerved, the margins and internerves pubescent with long appressed hairs; third glume slightly shorter than the fourth, 7-nerved, pubescent with appressed hairs; flowering glume deep chestnut brown at maturity, striate, apiculate. Palea of equal length and similar texture.

General distribution: in dry sandy soil. Massachusetts to Michigan, south to North Carolina and Indian Territory. August to September.

MASSACHUSETTS: Waltham, sandy ground, *W. P. Rich*, Sept. 2, 1889; Springfield, *Maria L. Owen*, Sept. 9, 1885; East Longmeadow, *W. Deane*, Aug. 31, 1895; Norwood, Purgatory swamp, *E. F.*

Williams, Sept. 15, 1895; Framingham, *E. C. Smith*, Sept. 5, 1897; Dedham, *E. & C. E. Faxon*, no date; West Quincy, gravelly road, Blue Hills Reservation, *W. P. Rich*, Sept. 30, 1894; West Hingham, Great Hill, *J. R. Churchill*, Sept. 2, 1890. RHODE ISLAND: Providence, *J. F. Collins*, Sept. 1, 1894; no locality, *W. W. Bailey*, in Herb. N. E. Bot. Club; no locality, *J. L. Bennett*, 1865. CONNECTICUT: New Haven, *J. A. Allen*, Sept. 15, 1878; Ayer City, *C. W. Swan*, Aug. 30, 1882.

* * Rachis flat, wing-margined.

2. PANICUM SANGUINALE Linn. Sp. Pl. 57. 1753. (*Digitaria sanguinalis* Scop. Fl. Carn. ed. 2, 1: 52. 1772; *Syntherisma praecox* Walt. Fl. Car. 76. 1788; *Paspalum sanguinale*, Lam. Tabl. Encycl. 1: 176. 1791; *Syntherisma sanguinalis*. Dulac. Fl. Hautes Pyr. 77. 1867.)

A much-branched, leafy annual 3–12 dm. high, at first erect but finally prostrate at the base and rooting at the lower nodes, with 3 to 10 erect or ascending racemes 5 to 18 cm. long. Sheaths loose, shorter than the internodes, the lower ones densely papillose-hirsute, the upper ones sparingly so or glabrous; ligule a scarious ring, 0.5 mm. long; leaf-blades 4–20 cm. long, 4–10 mm. wide, erect or ascending, more or less papillose-hirsute on both surfaces. Panicle finally exserted, racemes usually digitate, rachis triangular, the angles broadly winged, hispidulous on the margins. Spikelets 2.5–3 mm. long, elliptic-lanceolate, acute, in pairs on 3-angled pedicels; first glume minute, triangular, glabrous; the second glume about one-half as long as the spikelet, 3-nerved, the margins and internerves pubescent with appressed hairs; third glume about as long as the flowering glume, 7-nerved, pubescent on the margins; flowering glume yellowish-white when mature, apiculate, elliptic-lanceolate.

General distribution: in cultivated fields, roadsides and waste places, throughout North America. July to September. Introduced from Europe.

MAINE: North Berwick, *J. C. Parlin*, Sept. 1893 and Sept. 1894, East Auburn, roadsides, *E. D. Merrill*, July, 1898. MASSACHUSETTS: Bourne, sandy roadsides, *W. P. Rich*, Aug. 21, 1898; Lynnfield; roadside, *W. P. Rich*, Aug. 21, 1892; Chelsea, cultivated ground, *W. P. Rich*, July 29, 1888; Truro, sandy roadsides, *W. P. Rich*, Sept. 8, 1888; Stoneham, border of Spot Pond, *W. P. Rich*, Sept. 29, 1892; Revere, Oak Island, *H. A. Young*, Aug. 13, 1882, and Sept. 20, 1878; West Cambridge, clay pit, *E. F. Williams*, Aug. 28, 1897; Malden, Golding Mills, *F. S. Collins*, Sept. 25, 1887; Charlestown, *C. E. Perkins*, July, 28, 1881; Attleboro, *J. R. Churchill*, Aug. 6, 1897; Dorchester, *J. R. Churchill*, Sept. 7, 1883 and Sept. 20, 1888; Cambridge, yard, *W. Deane*, Aug. 24, 1883; Andover, *J. Blake*, Sept. 5, 1882, and Aug. 27, 1884; Nonquit, *E. L. Sturtevant*, Sept. 5, 1888; South Framingham, *E. L. Sturtevant*, Sept. 19, 1890.

Connecticut: South Glastonbury, 9 Francis Wilson, Aug. 23, 1892.

3. Panicum humifusum (Pers.) Kunth, Rev. Gram. 1: 33. 1835. (*Digitaria humifusa* Pers. Syn. 1: 85. 1805; *Panicum lineare* Krock. Fl. Sil. 1: 95. 1787, not Linn. 1762; *Syntherisma glabra* Schrad. Fl. Germ. 1: 163. 1806; *Panicum glabrum* Gaud. Agrost. 1: 22. 1811; *Paspalum ambiguum* D. C. Fl. Gall. 123. 1806; *Syntherisma linearis* Nash, Bul. Torr. Bot. Club, 22: 420. 1895. *Syntherisma humifusa* Ryd. Mem. N. Y. Bot. Gard. 1: 469. 1900.)

A slender, glabrous, at length much branched below, and prostrate annual 2 to 5 dm. high, with flat leaves and 2 to 6 slender, diverging spikes which are 2 to 8 cm. long. Sheaths flattened, glabrous; ligule a scarious ring about 2 mm. long; leaf-blades 1.5–13 cm. long, 2.5–6 mm. wide, erect or nearly so, glabrous. Racemes alternate or approximate in pairs, the rachis triangular, the lateral angles broadly winged, hispidulous on the margins. Spikelets slightly over 2 mm. long, elliptic, acutish, usually in pairs; outer glumes usually purplish, the first generally obsolete; second and third glumes about equal in length, slightly shorter than the flowering glume, pubescent with appressed hairs on the margins and internerves, the second 3-nerved, the third 7-nerved; flowering glume deep chestnut brown when mature, striate, acute.

General distribution: in cultivated grounds and waste places, Nova Scotia to Ontario and Minnesota, south to Louisiana, July to September. Introduced from Europe.

Maine: North Berwick, *J. C. Parlin*, Aug., 1891 and Aug. 25, 1892. Bradley, sandy river bank, *M. L. Fernald*, Sept. 16, 1897; Orono, waste places, *M. L. Fernald*, July 30, 1889; Mattawamkeag, railroad yard, *M. L. Fernald*, Sept. 14, 1898; East Auburn, lawns, *E. D. Merrill*, Aug. 12, 1896; South Poland, *Kate Furbish*, no date; Peru, *J. C. Parlin*, Sept., 1886. New Hampshire: Jaffrey, dry roadsides, 599 *B. L. Robinson*, Aug 29, 1898. Massachusetts, Plymouth, *Oakes*, no date; West Cambridge, clay pit, *E. F. Williams*, Aug. 28, 1897; West Quincy, *W. P. Rich*, Sept. 3, 1894; Chelmsford, *C. W. Swan*, Aug. 22, 1882; Cambridge, lawn, *W. Deane*, Aug. 28, 1883; Andover, *J. Blake*, June 21, 1883; Lynnfield, wood-road, *W. P. Rich*, Aug. 21, 1892; Dedham, low ground by railroad *W. P. Rich*, Aug. 22, 1897; Waltham, sandy ground, *W. P. Rich*, Sept. 2, 1889; Dorchester, *J. R. Churchill*, Sept. 7, 1884; Nonquit, *E. L. Sturtevant*, Sept. 5, 1888. Connecticut: New Haven, *J. A. Allen*, Sept. 30, 1877.

§ II. Eupanicum.

Spikelets awnless, all pedicellate in panicles, the branches of which are single or fascicled, usually naked below, spreading, or sometimes erect.

A. Basal and culm leaves all similar in shape, spikelet acute. (HOMOPHYLLA.)

* Panicle ovoid or oblong, primary branches spreading or ascending, secondary ones usually appressed, and densely flowered: spikelets short-pedicellate, not exceeding 3 mm. in length.

4. PANICUM AGROSTOIDES Sprengel, Pugill. 2: 4. 1815—Muhl. Gram. 119. 1817.—An erect, caespitose, glabrous, much branched perennial 4–6 dm. high, with compressed culms, long leaves and spreading pyramidal panicles 10–20 cm. long. Nodes smooth; sheaths compressed, loose, shorter than the internodes; ligule very short, naked; leaf-blades 3–5 dm. long, 4–8 mm. wide, acuminate, scabrous on the margins. Panicles terminating the culms or their branches, usually purplish, primary branches spreading, the secondary generally appressed and densely flowered giving the panicle a glomerate appearance. Pedicels scabrous, usually bearing few long white hairs at the apex. Spikelets nearly 2 mm. long, ovate, acute; first glume 3-nerved, acute, slightly scabrous on the keel at the apex, about one-half as long as the spikelet; second and third glumes equal, 5-nerved, acute, slightly scabrous on the keel, the third enclosing a hyaline palea about 1.2 mm. long, flowering glume ovate, about 1.3 mm. long, smooth. Palea as long as the glume, similar in texture.

General distribution: in wet grounds Maine to Minnesota, south to Florida and Texas, July to September.

MAINE: Bradley, Chemo Pond, *F. P. Briggs*, Sept. 1891; Brownfield, old fields, *E. D. Merrill*, Aug. 18, 1896; Denmark, intervales of the Saco River, *W. H. Merrill*, 1894; North Berwick, shores of mill-pond, 751 *J. C. Parlin*, Aug. 19, 1896; Androscoggin Lake, *Kate Furbish*, 1894. NEW HAMPSHIRE: Rye Beach, *W. Deane*, Aug. 29, 1886. MASSACHUSETTS: Malden, *R. Frohock*, 1880; Blue Hills, *W. H. Manning*, Aug. 23, 1894; Winchester, *W. P. Rich*, Aug. 19, 1888, and Aug. 5, 1894; Lynn, *W. P. Rich*, Aug. 25, 1889; Milton, *J. R. Churchill*, Sept. 18, 1887; Cambridge, *W. Deane*, Aug. 24, 1883; Andover, *J. Blake*, Aug. 14, 1882; Newburyport, *W. P. Conant*, no date. RHODE ISLAND: Providence, *J. Blake*, Sept. 10, 1857. CONNECTICUT: New Haven, *J. A. Allen*, Sept. 19, 1877; Southington, 621 *L. Andrews*, Aug. 18, 1898; Huntington, *E. H. Eames*, Aug. 6, 1895.

5. PANICUM LONGIFOLIUM Torr. Fl. U. S. 149. 1824.—An erect glabrous perennial 3–6 dm. high, with simple or rarely slightly branched slender culms, elongated narrow leaves and few-flowered panicles 10–20 cm. long. Culms compressed; nodes smooth; sheaths loose, compressed, glabrous, shorter than the internodes; ligule short, ciliate with erect white hairs 1–2 mm. long; leaf-blades 20–30 cm. long, 2–4 mm. wide, usually scabrous, long acuminate. Panicles open; primary branches spreading or ascending, elongated, slender;

secondary branches appressed, generally bearing 1 to 3 spikelets. Spikelets 2.5 mm. long, very acute or acuminate; first glume acute, one-half as long as the spikelet, 3-nerved, scabrous on the keel at the apex; second and third glumes equal, 5-nerved, acuminate, one-third longer than the obtuse flowering glume.

General distribution: in moist soil, Rhode Island to Florida, August to September.

Rhode Island: Shannock, *L. C. Moore*, Aug. 14, 1896; Lake Werden, *E. & C. E. Faxon*, Aug. 24, 1881.

This species is distinguished from *Panicum agrostoides* by its slender, simple, much flattened culms, long narrow leaves, ciliate ligule, long slender panicle branches and larger, more acute spikelets which are almost racemosely arranged, not glomerate as in that species.

** Panicle strict, narrow, the branches appressed; spikelets 5 to 6 mm. long.

6. Panicum amaroides Scribn. & Merrill, U. S. Dept. Agr. Div. Agros. Cir. **29**: 5. 1901. (*Panicum amarum minor* Vasey & Scribn. U. S. Dept. Agr. Div. Bot. Bul. **8**: 38. 1889, not *P. capillare minor* Muhl. 1817.)—A glabrous, glaucous, non-caespitose perennial, 3 to 8 dm. high, from horizontal rootstocks, with thick often involute leaves and narrow, contracted panicles. Culms erect, often somewhat branched below, stout, the lower internodes very short; nodes smooth. Sheaths loose, glabrous, crowded and overlapping; ligule a dense fringe of soft white hairs 2 to 3 mm. long; leaf-blades very thick, smooth, lanceolate, acuminate, not narrowed at the rounded base, 1 to 3 dm. long, 5 to 10 mm. wide, strongly involute, at least above. Panicles 1 to 2.5 dm. long, few-flowered, the branches 1 to 7 cm. long, appressed. Spikelets glabrous, ovate, acuminate, 5 to 6 mm. long; first glume clasping the base of the spikelet, ovate, acuminate, strongly 7-nerved, three-fourths, or sometimes as long as the spikelet, usually scabrous on the keel toward the apex; second glume slightly exceeding the third, 7-nerved, similar to the first; third glume thin, faintly 7-nerved, enclosing the flowering glume and palea, subtending a thin palea of equal length and a staminate flower; flowering glume 3 to 3.5 mm. long, elliptical-ovate, smooth.

General distribution: in sands along the coast, Connecticut to Florida and Mississippi, August to October.

Connecticut: New Haven, *D. C. Eaton*, no date; *J. A. Allen*, Sept. 30, 1876; *A. L. Winton, Jr.*, 1887.

This species is readily distinguished from *Panicum amarum* Ell., by its smaller size, smaller panicles, larger spikelets and longer first glume, and is strikingly different from that species in habit of growth.

*** Panicle diffuse, the slender capillary branches widely spreading, single or fascicled; spikelets generally long-pedicellate.

† Perennials.

‡ A stout erect plant; spikelets glabrous.

7. *Panicum virgatum* L. Sp. Pl. 59. 1753. — A stout, erect perennial, 9–15 dm. high, with strong creeping rootstocks, long, flat leaves and ample spreading panicles. Culms smooth, terete; sheaths smooth, ciliate along the margins above; ligule very short, naked, or densely ciliate and long pilose; leaf-blades 25–60 cm. long, 4–10 mm. wide, scabrous on the margins, sometimes pilose above, near the base, otherwise smooth, long-acuminate-pointed. Panicle 15–50 cm. long, the branches solitary, or several together, more or less widely spreading, rather rigid, the lower 10–25 cm. long. Spikelets ovate, acuminate, 4–5 mm. long, the acuminate first glume about one-half the length of the spikelet, 3 to 5-nerved; second glume usually longer than the others, 5 to 7-nerved, as in the third, which has a palea and usually a staminate flower in its axil; flowering glume smooth and shining, distinctly shorter than the larger outer glumes.

General distribution: in sandy soil, usually along streams and about ponds, Maine to North Dakota and Colorado, south to Florida and Texas (Mexico), June to October.

Maine: Wells, *Kate Furbish*, 1879; Kennebunk, *W. H. Manning*, July 28, 1894; Sebec, shore of Sebec Lake, *J. W. Freese*, 1895; Oldtown, Pushaw Bridge, *M. L. Fernald*, Sept. 18, 1897. New Hampshire: Hindsdale, 549 *B. L. Robinson*, 1898. Vermont: Vernon, open grounds, 87 *B. L. Robinson*, Aug. 2, 1898. Massachusetts: Malden, *R. Frohock*, 1879; Revere, *W. P. Rich*, Aug. 5, 1888; Oak Island, *H. A. Young*, Aug. 6, 1882, July 30, 1882 and July 27, 1879, also *W. Deane*, Sept. 13, 1894; Montague, *J. R. Churchill*, July 28, 1857; Nonquit, *E. L. Sturtevant*, Aug. 29, 1888 and July 25, 1889; Framingham, *E. C. Smith*, July 27, 1897; Saugus, *W. P. Rich*, Aug. 4, 1889; Wareham, along borders of a salt marsh, *W. P. Rich*, Aug. 6, 1891; Nantasket Beach, meadow, *W. P. Rich*, July 23, 1896; Milton, *J. R. Churchill*, Aug. 5, 1883; Dorchester, *J. R. Churchill*, 1883; Springfield, *W. Deane*, Aug. 31, 1895. Rhode Island: East Providence, *J. F. Collins*, July 24, 1892; Providence, *J. Blake*, Sept, 10, 1857. Connecticut; New Haven, *J. A. Allen*, Sept. 19, 1877.

‡ ‡ A weak spreading plant; outer glumes warty-roughened.

8. Panicum verrucosum Muhl. Gram. 113. 1817. (*Panicum debile* Ell. Sk. Bot. S. C. and Ga. 1: 129. 1817, not Desf. 1800.)— A slender, branching perennial, with flat leaves and few-flowered, spreading panicles. Culms very smooth, weak, decumbent or reclining, rarely erect, 3–9 dm. long. Sheaths smooth, much shorter than the internodes, ciliate on the margins above; ligule very short, ciliate; leaf-blades lanceolate, 8–15 cm. long, 4–8 mm. wide, scabrous on the margins, contracted at the base, very acute. Panicles 8–20 cm. long, capillary, branches solitary or in pairs the lower 5–10

cm. long, naked below, the secondary branches appressed and few (1–4) flowered. Spikelets 2 mm, long, oval, acute; outer glumes apparently nerveless, the first smooth, one-fourth as long as second and third, which are tuberculate-roughened (verrucose); flowering glume abruptly sharp pointed or submucronate, smooth. Palea with a callus-like elevation at the base.

General distribution: in damp, rich, shaded soils, Massachusetts to Tennessee, Florida and Louisiana, mostly near the coast, July to September. Rare in New England.

Massachusetts: Plymouth, *Oakes*, no date; Centreville, gravelly shore of Nine Mile Pond, *W. P. Rich*, Sept. 4, 1898; Springfield, island in Red House Pond, *F. W. Batchelder*, Sept. 28, 1894.

This species is readily distinguished by its slender straggling habit and rough, nerveless outer glumes.

† † Annuals.

‡ Glabrous or nearly so.

9. Panicum proliferum Lam. Encycl. 4: 747a. 1797. (*Panicum geniculatum* Muhl. Gram. 123. 1817.) — A smooth, usually much-branched annual, with rather coarse spreading or ascending (rarely erect) stems, 6–12 or 18 dm. long, flat leaves and diffuse terminal and lateral panicles. Sheaths smooth, lax, somewhat flattened; ligule ciliate; leaf-blades 15 to 30 or 60 cm. long, 4–20 mm. wide, acute, scabrous on the margins and sometimes also on the prominent nerves, rarely pilose on the upper surface. Panicles pyramidal, 10 to 12 or 40 cm. long, the primary and secondary branches spreading, scabrous. Spikelets rather crowded on short appressed and scabrous pedicels, ovate lanceolate, acute, 2–3 mm. long, smooth, green or purplish; first glume embracing the base of the spikelet, usually obtuse and nerveless, rarely 1–3-nerved, one fourth to one-third as long as the nearly equal, acute 5 to 7-nerved second and third glumes, the latter sometimes having a hyaline palea in its axil; floral glume elliptical, subacute, smooth and shining, a little shorter than the larger outer glumes. Anthers saffron yellow.

General distribution: in wet soil, Maine to Pennsylvania and Nebraska, south to Florida and Texas, July to September.

Maine: North Berwick, *J. C. Parlin*, Aug. 28, 1891; Saco, waste places, *J. C. Parlin*, Aug. 27, 1887; Gott's Island, *F. L. Harvey*, Aug., 1896; Kennebunk, *J. Blake*, Aug. 23, 1880. Massachusetts: Truro, cranberry meadow, *W. P. Rich*, Sept. 8, 1898; Agawam, *W. Deane*, Sept. 3, 1895; Andover, *J. Blake*, Sept. 1, 1883; Nantucket, Gibb's Pond, *W. Deane*, Sept. 11, 1885, also *J. R. Churchill*, Sept. 11, 1885; South Boston, *H. A. Young*, Sept. 25, 1888, *W. P. Rich* Aug. 29, 1888; Boston, *E. C. Smith*, Sept., 1899; Framingham, 751 *E. C. Smith*, Sept. 1899; also *E. L. Sturtevant*, Sept. 28, 1890; Dartmouth, *E. L. Sturtevant*, Sept. 13, 1889; Hingham, 751 *E. C.*

Smith, Sept. 1899; Marthas Vineyard, *Sydney Harris*, Aug. 27, 1895; Blue Hills, Pine-tree Pool, *W. H. Manning*, Sept. 2, 1895; Plymouth, *Oakes* collection, in Gray Herbarium; Medford, *F. S. Collins*, Sept. 15, 1887; Uxbridge, *J. W. Robbins*, Sept., 1864. CONNECTICUT: New Haven, *J. A. Allen*, Sept., 1876.

‡ ‡ More or less hirsute.

10. PANICUM CAPILLARE Linn. Sp. Pl. 58. 1753.— An annual with usually coarse, branching stems, 3–9 dm. long, very hairy leaf-sheaths and capillary, widely-spreading panicles, which are terminal on the culm or its branches. Culms geniculate and branching near the base, rarely simple, generally pilose or pubescent below the bearded nodes. Sheaths pilose to densely hirsute, with spreading hairs; ligule very short, finely ciliate; leaf-blades flat, lanceolate or linear, acute, usually thinly hairy on both sides, margins scabrous and ciliate near the base, the hairs throughout spring from small papillae, those on the leaf-blade being confined chiefly to the principal nerves. Panicle diffuse, 8–30 cm. long, the branches solitary, in pairs or rarely whorled, the ultimate branches and pedicels strongly hispid. Spikelets 2 mm. long, ovate, acute, or abruptly acuminate-pointed, smooth; first glume clasping the base of the spikelet, obtuse or acute, 1 to 3-nerved, about one-third the length of the 5 to 7-nerved and nearly equal second and third glumes, the acute tips of these are sometimes minutely pubescent; flowering glume smooth and shining, elliptical, obtuse, or subacute, a little shorter than the larger outer glumes. Variable.

General distribution: in dry soil, waste ground and cultivated fields, Nova Scotia to British Columbia, south to Florida, Nevada and Texas. July to September. Introduced from Europe.

MAINE: Fort Fairfield, gravelly shores, *M. L. Fernald*, Sept. 9, 1896; Dover, roadsides, *M. L. Fernald*, Aug. 27, 1894; Orono, dry fields, *M. L. Fernald*, Aug. 28, 1889; East Auburn, waste places, *E. D. Merrill*, Aug. 1897. NEW HAMPSHIRE: Jaffrey, dry sandy soil, 396 *B. L. Robinson*, Sept. 1897; Randolph, *J. R. Churchill*, Aug. 4, 1889; Gilmanton, *J. Blake*, Sept. 6, 1869. MASSACHUSETTS: Malden, *F. S. Collins*, Aug. 9, 1887; Revere, Oak Island *H. A. Young*, Aug. 27, 1882, Nonquit, *E. L Sturtevant*, Sept. 5, 1888; South Framingham, *E. L. Sturtevant*, Aug. 11, 1890; South Boston, *W. P. Rich*, Aug. 29, 1888, a low reduced form; Mystic Pond, *W. P. Rich*, Sept. 29, 1891; Dorchester, *J. R. Churchill*, Sept. 8, 1883; Cambridge, *W. Deane*, Aug. 23, 1883 and Sept. 20, 1886.

11. PANICUM MINIMUM (Engel.) Scribn. & Merrill, U. S. Dept. Agr. Div. Agros. Cir. 27: 4. 1900. (*Panicum capillare minimum* Engel. in Scribn. Tenn. Agr. Exp. Sta. Bul. 7^2: 44. *fig. 40.* 1894; *Panicum minus* Nash, Bul. Torr. Bot. Club, **22**: 421. 1895, not *Panicum capillare minor* Muhl. Descr. 124. 1817.)

A slender annual, rarely more than 3 dm. high, with long-pilose sheaths narrow flat leaves, and oval or pyramidal, few-flowered panicles, 8–16 cm. long. Leaves 5–10 cm. long, 2–6 mm. wide, erect, more or less pubescent. Panicles open, the lower branches 5–7 cm. long, spreading or ascending. Spikelets about 1.5 mm. long, elliptic, acute, smooth, usually borne in pairs at the extremities of the ultimate branches of the panicle; first glume about one-third as long as the equal, acute, second and third ones; flowering glume somewhat shorter than the third.

General distribution: In dry woods, thickets and on the margins of lakes and streams, New Brunswick to Georgia and Missouri. August to September.

Maine: Mattawamkeag, river banks, 2802 *M. L. Fernald*, Sept. 14. 1898; Masardis, *M. L. Fernald*, Sept. 8, 1898. Vermont: Head of Lake Memphramagog, *E. Tuckerman*, Sept. 1859, in Gray Herbarium (*Panicum soboliferum* Tuckerman in Herb.). Massachusetts: North Andover, *J. Blake*, Sept. 27, 1883.

It is possible that this form is only worthy of varietal rank, although the extreme form is very distinct from *Panicum capillare*. In many cases, however, the two species can only be separated arbitrarily.

12. Panicum miliaceum Linn. Sp. Pl. 58. 1753. — A rather stout, erect annual 3 to 8 dm. high. Culms glabrous or hirsute. Sheaths papillose-hirsute, often with tawny hairs; ligule very short, ciliate; leaf-blades 10–30 cm. long, 6–16 mm. wide, more or less pubescent. Panicle open, rather densely flowered, 12–35 cm. long; branches erect or ascending. Spikelets 5 mm. long, acuminate; first glume about two-thirds as long as the spikelet, 5 to 7-nerved, acuminate: second glume acuminate, equaling the spikelet in length, 13-nerved, somewhat exceeding the 7 to 13-nerved third glume which subtends an empty palea: flowering glume about 3 mm. long, obtuse, obscurely 5-nerved, becoming indurated and shining.

General distribution: in waste places, Maine to Pennsylvania, July to September, introduced from Europe.

Maine: Orono, waste places, *F. L. Harvey*, Sept. 1897 also, gravelly roadsides, *M. L. Fernald*, Oct. 1, 1889; North Berwick, *J. C. Parlin*, Sept. 1892. Vermont: Burlington, introduced about lumber yards, *Ezra Brainerd*, Sept. 4, 1895. Massachusetts: Cambridge, roadside and also on ballast, *M. L. Fernald*, Aug. 1891; East Cambridge, *F. S. Collins*, Sept. 2, 1887; Boston, waste ground, *E. F. Williams*, Aug. 27, 1896; South Boston, waste ground, *H. A. Young*, Aug. 2, 1879; Newton, *E. C. Smith*, July 12, 1899; Nantucket, waste ground, *W. Deane*, Sept. 9, 1885; Dracut, *C. W. Swan*, Aug. 4, 1884; Beachmont, growing among stones on ridge of beach, *W. P. Rich*, Aug. 12, 1890. Rhode Island: Providence, *J. F. Collins*, Sept. 2, 1894.

B. Basal leaves very different in shape, and much smaller than those of the culm; leaves of the branches smaller and more crowded than those of the primary stem; spikelets usually abruptly acute or obtuse (*Panicum depauperatum* excepted) (HETEROPHYLLA).

* Leaves linear, elongated, very narrow, erect; panicles small, few-flowered, the differentiated basal leaves rarely evident.

† Spikelets 3.5 mm. long, apparently beaked.

13. PANICUM DEPAUPERATUM Muhl. Gram. 112. 1817. (*Panicum strictum* Pursh. Fl. Am. Sept. 1: 69. 1814, not R. Br. 1812; *Panicum involutum* Torr. Fl. U. S. 124. 1824).—A slender erect or ascending perennial, usually much branched near the base, 1.5 to 4 dm. high, with very narrow erect leaves 8 to 20 cm. long, $\frac{3}{4}$ mm. wide, few-flowered narrow panicles 4 to 10 cm. long, and nearly smooth spikelets about 3.5 mm. long. Sheaths glabrous or hirsute; leaves erect, mostly crowded at the base, the upper culm-leaf usually exceeding the panicle. Spikelets ovate, acute, in dried specimens appearing somewhat beaked; first glume about one-third as long as the spikelet, clasping the base of the spikelet, second and third glumes equal, 7 to 9-nerved, glabrous or sometimes pilose with few hairs.

General distribution: open woodlands and gravelly fields, Nova Scotia to Manitoba, south to Florida and Texas.

MAINE: East Auburn, *E. D. Merrill*, Aug. 1898; Southport, *M. L. Fernald*, Aug. 8, 1894; Rumford Falls, *C. H. Knowlton*, July 8, 1893; South Berwick, open dry woods, *M. L. Fernald*, Sept. 26, 1897. NEW HAMPSHIRE: Jaffrey, dry hillsides, *B. L. Robinson*, July 12, 1898. VERMONT: Rutland, 1757, *W. W. Eggleston*, June 12, 1899; Colchester, *L. R. Jones*, Aug. 31, 1900. MASSACHUSETTS: Walpole, gravelly roadsides, *W. P. Rich*, June 7, 1896, *J. R. Churchill*, June 7, 1896; Malden, *F. S. Collins*, June 14, 1887; Mt. Wachusett, *J. F. Collins*, July 13, 1893; Lynnfield, *H. A. Young*, June 17, 1879; Framingham, *E. C. Smith*, June 24, 1892; Nonquit, *E. L. Sturtevant*, May 28, 1889; Milton, borders of woods, Blue Hills, *W. P. Rich*, July 1, 1891; Melrose, rocky wooded hillsides, cascade region, *W. P. Rich*, June 18, 1894; Truro, dry fields and hillsides, *W. P. Rich*, June 21, 1898; Dorchester, Mattapan, *J. R. Churchill*, June 16, 1886; Waltham, sandy soil, *W. Deane*, June 22, 1884; Nantucket, *J. R. Churchill*, July 3, 1886; Concord, *H. Mann*, no date; West Gloucester, *C. W. Swan*, July 8, 1893; Gloucester, Eastern Point, *E. L. Rand & B. L. Robinson*, June 7, 1896; Stony Brook Reservoir, Metropolitan Park Flora, *G. L. Chandler*, June 17, 1895. RHODE ISLAND: Providence, *J. F. Collins*, June 8, 1892. CONNECTICUT: Waterford, dry sandy woods, Fog Plain, 7 *C. B. Graves*, July 5, 1898; Montville, woods on Poll's Hill, 81 *C. B. Graves*, June 19, 1897; Ledyard, woods on Decatur Hill, 86 *C. B. Graves*, June 10, 1897.

† † Spikelets 2 to 2.5 mm. long, obtuse.

14. Panicum linearifolium Scribn. U. S. Dept. Agr. Div. Agros. Bul. 11: 42, *pl. 1.* 1898. (*Panicum depauperatum* Muhl. Gram. 112. 1817, in part; *Panicum depauperatum laxa* Vasey, U. S. Dept. Agr. Div. Bot. Bul. 8: 29. 1889, not *Panicum laxum* Swartz, 1788.)

A slender, erect, densely caespitose grass, 2 to 4 dm. high, with rather long, linear leaves and open panicles 5 to 8 cm. long. Culms simple or branching near the base, glabrous, sheaths glabrous or pilose, with rather long (3 mm.) spreading hairs; ligule a dense fringe of hairs; leaf-blades 5 to 15 cm. long, about 4 mm. wide, very acute, scabrous on both sides and occasionally sparingly pilose. Panicle-branches solitary or in pairs, more or less spreading, often flexuous, scabrous. Spikelets obovate or oblong, obtuse, 2 to 2.5 mm. long; first glume nerveless, pilose at least near the base, broadly obtuse, clasping the base of the spikelet, about 0.5 mm. long; second and third glumes as long as the spikelet, oblong, obtuse, 7-nerved, sparingly pilose; the third with a palea about half its length; flowering glume 2 mm. long, obtuse.

General distribution: in dry soil, Maine to Missouri, southward to Texas. June–August.

Maine: Orono, dry woods, *M. L. Fernald*, July, 1890 and dry, wooded slope, 506 *M. L. Fernald*, July 14, 1890; North Berwick, *M. L. Fernald*, June 13, 1896. New Hampshire: Windham, Corbett's Pond, *C. W. Swan*, July 9, 1890. Vermont: Burlington, *L. R. Jones*, July 25, 1892; Moncton, *C. G. Pringle*, 1878; Manchester, 284 *M. A. Day*, June 21, 1898. Massachusetts: West Quincy, *J. R. Churchill*, July 4, 1891; Ashburnham, *Sydney Harris*, June 12, 1896; Melrose, rocky bank of Cascade, *W. P. Rich*, June 16, 1895; Andover, J. Blake, July 21, 1882 and June 21, 1884; Boston, *C. W. Swan*, June 25, 1881. Connecticut: New Haven, *J. A. Allen*, June 14, 1877; Southington, *C. H. Bissell*, June 17, 1897.

This species is similar in habit and is very closely related to *Panicum depauperatum* from which it is at once distinguished by its smaller and more obtuse spikelets. In *Panicum depauperatum* the spikelets are about 3.5 mm. long and the second and third glumes are decidedly longer than the flowering glume and more prominently nerved, the first glume being distinctly 1- and occasionally 3-nerved, the second usually 9-nerved. When dry the spikelets in *P. depauperatum* have the appearance of being slightly beaked, while in *P. linearifolium* they are distinctly obtuse.

* * Leaves usually spreading, extremely variable, lanceolate or linear lanceolate, rounded, truncate or clasping at the base.

† Panicles strict, narrow, the branches erect.

15. Panicum xanthophysum A. Gray, Ann. Lyc. N. Y. 3: 234. 1835; Gram. & Cyp. 1: no. 28. (*Panicum calliphyllum* Ashe, Journ. E. Mitch. Sci. Soc. 15: 31. 1898.) — A rigid erect, light green

or somewhat yellowish perennial, 1.5–6 dm. high, with simple culms, erect, lanceolate leaves and few-flowered contracted panicles 5–10 cm. long. Culms glabrous, branching at the base; nodes smooth; sheaths striate, sparingly pilose-pubescent or nearly smooth, shorter than, or sometimes exceeding the internodes: ligule very short; leaf blades 4–15 cm. long, 6–20 mm. wide, erect, rounded and somewhat clasping at the base, acute or acuminate, strongly nerved, nearly smooth, except on the strongly serrulate-scabrous margins, sometimes ciliate at the base. Panicle subsimple, exserted, its branches appressed, nearly smooth. Spikelets obovoid, obtuse, about 3 mm. long, first glume 3-nerved, lanceolate, about one-half as long as the nearly equal second and third glumes which are 9-nerved and sparingly pubescent or rarely nearly glabrous; flowering glume smooth and shining.

General distribution: in dry soil, Quebec to Pennsylvania, west to Minnesota and Manitoba. June to August.

MAINE: Rumford, *J. C. Parlin*, 1889; Orono, gravelly soil, *M. L. Fernald*, July 14, 1890, open sandy soil, 345 *M. L. Fernald*, July 26, 1895, and sandy river thicket, *M. L. Fernald*, July 12, 1897; Madison, sandy woods, 521 *M. L. Fernald*, 1892; North Berwick, *J. C. Parlin*, July 5, 1891; South Berwick, 519 *J. C. Parlin & M. L. Fernald*, June 13–14, 1896; Mechanic Falls, *J. A. Allen*, July 11, 1897; Harrison, *J. Blake*, July 1884; York, dry woods, *M. L. Fernald*, July 17, 1891; Buckfield, *J. A. Allen*, July 1, 1878; Wells, *Kate Furbish*, 1879; Gilead, gravelly soil, *Kate Furbish*, July, 1897; East Auburn, *E. D. Merrill*, July, 1898. NEW HAMPSHIRE: Upper Gilmantown, *J. Blake*, July 1, 1869; Shelburn, dry woods, *W. Deane*, Aug. 8, 1883 and July 25, 1884. VERMONT: Burlington, sandy open woods, *L. R. Jones*, July 20, 1893 and June 28, 1896; Snake Mt., Addison, *L. R. Jones*, July 1, 1898; Vernon, *A. J. Grout*, Aug. 2, 1895. MASSACHUSETTS: Amherst, *H. G. Jesup*, July, 1874; Ashburnham, *S. Harris*, July 12, 1896; Springfield, *W. H. Chapin*, June 25, 1885.

PANICUM XANTHOPHYSUM forma AMPLIFOLIUM Scribn. in Fl. Vt. 104. 1900.—Culms stout; lower sheaths crowded, strongly striate and papillate-hirsute, blades firm, 10–20 mm. wide. Dry sandy soil, Burlington, Vt., *Prof. L. R. Jones* collector, August 31, 1893.

†† Panicles ovate, open, the branches spreading.

‡ Leaf-blades ample, 2 to 3 cm. broad, cordate and clasping at the base.

§ Sheaths papillose-hispid.

16. PANICUM CLANDESTINUM Linn. Sp. Pl. 58. 1753. (*Panicum pedunculatum* Torr. Fl. U. S. 141. 1824; *Panicum clandestinum pedunculatum* A. Gray, Man. Bot. 613. 1848; *Panicum decoloratum* Nash. Bull. Torr. Bot. Club, **26**: 570. 1899.)—A rather stout, ascend-

ing or erect, and finally much branched perennial 9–12 dm. high, with usually very rough hispid sheaths and broad leaves. Culms glabrous, at first simple, becoming much branched later in the season; nodes smooth. Sheaths shorter than, or often exceeding the internodes, much crowded on the branches, rough tuberculate-hispid, rather soft pubescent, or sometimes nearly smooth, ciliate-pubescent on the margins: ligule very short; leaf-blades broadly lanceolate, 8–20 cm. long, 15–30 mm. wide, cordate-clasping at the base, acuminate, usually smooth on both sides or the lower ones sometimes somewhat pubescent beneath, serrulate scabrous on the cartilaginous margins and often ciliate near the base. Panicle diffuse, that of the primary stem 8–15 cm. long and finally exserted, those of the branches partly or wholly concealed within the leaf sheaths; rachis striate, slightly scabrous; branches decompound to the base, alternate, scabrous as are also the pedicels which for the most part are longer than the spikelets. Spikelets obovate, elliptical, 2.5–3 mm. long, smooth or thinly pilose; first glume about one-half as long as the nearly equal nine-nerved second and third glumes, the latter with a palea in its axil; flowering glume minutely pubescent at the apex, otherwise smooth. Leaves on the branches shorter and more crowded and the sheaths more rough hairy than on the primary stem. The primary, terminal exserted panicle disappears after the development of the lateral branches.

General distribution: Along banks of streams and rivers and in low thickets, Quebec to Michigan, south to Georgia, Missouri, and Texas. May to September.

MAINE: Foxcroft, gravelly thicket, 292 *M. L. Fernald*, July 17, 1895; and 518 *M. L. Fernald*, July 29, 1894; Gilead, thickets, *Kate Furbish*, July, 1897; Livermore Falls, *Kate Furbish* (no date); Farmington, *C. H. Knowlton* (no date); Eddington, river thicket, *M. L. Fernald*, Sept. 16, 1897; Rumford, *J. C. Parlin*, Aug. 1889; Mattawamkeag, river thicket, 2814 *M. L. Fernald*, Sept. 14, 1898; Harrison, *J. Blake*, Sept. 1869. NEW HAMPSHIRE: East Jaffrey, roadsides, 335, *B. L. Robinson*, July 19, 1897; Lebanon, *G. G. Kennedy*, June 27, 1896; Shelburne, *W. Deane*, Aug. 31, 1884. VERMONT: Brattleboro, 86 *B. L. Robinson*, Aug. 2, 1898. MASSACHUSETTS: Cotuit, *W. P. Rich*, July 18, 1890; Border of Saugus River, *W. P. Rich*, Aug. 4, 1889; Milton, border of Neponset River, *J. R. Churchill*, Aug. 23, 1885; Montague, *J. R. Churchill*, July 28, 1887; Hyannis, *J. R. Churchill*, July 4, 1886; Cambridge, *H. Mann* (no date); Ashland, *W. Deane*, July 3, 1884; Framingham, *E. C. Smith*, July, 1897; South Framingham, *E. L. Sturtevant*, July 6, 1890; Nonquit, *E. L. Sturtevant*, July 12, 1888 and July 5, 1889; Wilmington, *F. S. Collins*, June 25, 1887; Lowell, *C. W. Swan*, June 19, 1882 and Aug. 3, 1880; Watertown, *C. W. Swan* July 20, 1888; East Gloucester, Niles Farm, *C. W. Swan*, Aug. 12, 1882. RHODE ISLAND: East Providence,

J. F. Collins, Aug. 26, 1893. CONNECTICUT: New Haven, *J. A. Allen*, Aug. 5, 1879; Southington, *L. Andrews*, June 29, 1898.

§ § Sheaths smooth or soft pubescent.

17. PANICUM MACROCARPON Le Conte in Torr. Cat. Pl. N. Y. 91. 1819. — A rather stout, glabrous perennial 3–10 dm. high with broad, lanceolate leaves, glabrous sheaths and few-flowered, open panicles 5–15 cm. long. Culms glabrous, more or less branched above; nodes smooth or the lower ones rarely slightly bearded. Sheaths shorter than the internodes, striate, smooth or rarely sparingly pubescent, generally somewhat ciliate on the margins; ligule very short; leaf-blades 5–17 cm. long, 2–4 cm. wide, cordate clasping at the base, long-acuminate, glabrous on both sides or with few scattered strigose hairs, usually ciliate on the serrulate-scabrous margins, especially near the base. Panicle exserted or often somewhat enclosed in the upper sheath; rachis glabrous; branches alternate, decompound, glabrous, spreading-erect. Spikelets 3–3.4 mm. long, oval to obovate; first glume one-third to one-half as long as the spikelet, acute or obtuse; second and third glumes pubescent, turgid, 9–11-nerved; flowering glumes 2.5–3 mm. long minutely pubescent at the apex.

General distribution: Dry rocky woods, thickets, etc., Maine and Ontario to the District of Columbia, west to Wisconsin and Iowa. June to September.

MAINE: Orono, rocky open woods, 346 *M. L. Fernald*, July 26, 1895 and Aug. 2, 1889; Madison, dry woods, *M. L. Fernald*, Aug. 1, 1892; North and South Berwick, *M. L. Fernald & J. C. Parlin*, June 13–14, 1896; East Auburn, *E. D. Merrill*, Aug. 1898; North Berwick, *J. C. Parlin*, July 17, 1891; Woodstock, *J. C. Parlin*, 1887. VERMONT: Manchester, 216 *M. A. Day*, June 29, 1898; MASSACHUSETTS: Mt. Wachusett, woods, *J. F. Collins*, July 14, 1893; Framingham, 613 *E. C. Smith*, July 8, 1892; *E. C. Smith*, July 1897; South Framingham, *E. L. Sturtevant*, July 6, 1890; Nonquit, *E. L. Sturtevant*, June 18, 1889; Revere, Oak Island, *H. A. Young*, July 7, 1878 and June 25, 1892, also *W. P. Rich*, July 5, 1891; Winchester, *C. E. Perkins*, June 19, 1893; Mt. Holyoke, *J. Blake*, June, 1858; Andover, *J. Blake*, July, 1882; Dorchester, *J. R. Churchill*, July 1, 1882; West Quincy, *J. R. Churchill*, June 29, 1888; Ashland, *W. Deane*, July 3, 1884; Rockport, Pigeon Cove, *C. W. Swan*, July 15, 1881; Lowell, moist thickets, *C. W. Swan*, July 28, 1859; Blue Hills, *W. H. Manning*, Aug. 11, 1894; Middlesex Fells, *W. H. Manning*, Aug. 4, 1894; Stony Brook Reservation, Metropolitan Park, *G. L. Chandler*, June 17, 1895. CONNECTICUT: Waterford, dry sandy woods, Fog Plain, 89 *C. B. Graves*, July 5, 1898.

18. PANICUM LATIFOLIUM Linn. Sp. Pl. 73. 1753 (excluding reference to Sloane). (*Panicum latifolium* Walt. Fl. Car. 73. 1788;

P. walteri Poir. Lam. Encycl. Suppl. **4**: 282. 1816, not Pursh, 1814; *P. latifolium molle* Vasey, U. S. Dept. Agr. Div. Bot. Bul. **8**: 34. 1889; *P. porterianum* Nash, Bul. Torr. Bot. Club, **22**: 420: 1895; *P. pubifolium* Nash, ibid. **26**: 577. 1899). — A rather slender, densely pubescent or rarely nearly glabrous, tufted perennial 3–7 dm. high, with broad, ovate, or lanceolate leaves, and rather large spikelets in few-flowered, open panicles. Culms finally much branched above, glabrous or pubescent; nodes densely bearded with long reflexed hairs. Sheaths shorter than the internodes pubescent with long spreading hairs, also with a dense ring of hairs at the apex, or rarely nearly glabrous; ligule very short; leaf-blades 7–11 cm. long, 2–3 cm. wide, acute or acuminate, gradually narrowed to the rounded, cordate-clasping base, serrulate-scabrous on the margins, sparingly strigose-pubescent on the upper surface, pubescent with short, soft hairs on the lower surface or sometimes nearly glabrous. Panicle 3–11 cm. long, exserted or sometimes partly included in the upper sheath; rachis more or less densely pubescent with soft spreading hairs, or glabrous; branches alternate, glabrous or pubescent. Spikelets 4–5 mm. long, narrowly obovate, pubescent with long spreading hairs; first glume 3-nerved, about one-half as long as the spikelet, obtuse or acute; second glume 11-nerved, a little shorter than the third glume which subtends a hyaline palea nearly its own length; flowering glume about 3.5 mm. long, pubescent at the obtuse apex.

General distribution: In open woodlands and thickets, Massachusetts to Illinois, south to Florida and Texas. June to October.

MASSACHUSETTS: West Quincy, *J. R. Churchill*, July 9, 1894. CONNECTICUT: New Haven, *J. A. Allen*, July 14, 1879; Ledyard, Decatur Hill, 78 *C. B. Graves*.

‡ ‡ Leaves less than 2 cm. broad, not cordate-clasping.

§ Spikelets 3 mm. long; whole plant very firm in texture.

19. PANICUM SCRIBNERIANUM Nash, Bul. Torr. Bot. Club, **22**: 421, 1895. (*Panicum pauciflorum* of A. Gray, Man. Bot. 613, 1848, not Ell. 1817; *Panicum scoparium* of S. Wats in A. Gray, Man. Bot. ed. 6, 632. 1890, not Lam. 1797; *Panicum scoparium minor* Scribn. Tenn. Agr. Exp. Sta. Bul. 7^2: 48. 1894, not *Panicum capillare minor* Muhl. 1817.)

An erect and finally branching perennial, 1.5 to 6 dm. high, with usually palpillate-pilose sheaths, more or less spreading flat leaves, which are smooth above, and ovoid panicles, 4 to 8 cm. long. Sheaths shorter than the internodes; ligule a short ciliate fringe; leaf-blades firm, lanceolate 5 to 10 cm. long, 6 to 12 mm. wide, acuminate, somewhat clasping at the rounded or truncate base, more or less spreading, scabrous on the margins and on the lower surface which is sometimes pubescent. Panicles open, few-flowered,

the primary one exserted, its branches spreading often flexuous, the secondary ones much smaller and more or less included. Spikelets obovoid, 3 mm. long, obtuse; first glume triangular, about one-third as long as the spikelet or less; second and third glumes equal, 7 to 9-nerved, pubescent with rather short spreading hairs.

General distribution: in dry or moist soil, Maine and Ontario to Washington south to Alabama, Kansas, and Arizona. June to August.

Maine: South Berwick, *M. L. Fernald*, Sept. 26, 1897; dry open woods, 996 *J. C. Parlin*, Sept., 1897; York, *M. L. Fernald*, July 15, 1891. Vermont: Westminster, *B. L. Robinson*, June 16, 1898; Brattleboro, *A. J. Grout*, July 8, 1895. Massachusetts: Wellesley, on a railroad embankment, 731 *E. C. Smith*; Needham, dry sterile fields, *T. O. Fuller*, June 22, 1890; Reading, *C. E. Perkins*, June 4, 1883; Revere, gravelly ground, *W. P. Rich*, June 10, 1899; Wilmington, *W. P. Rich* June 11, 1899; Wakefield, *F. S. Collins*, June 12, 1887; Ipswich, sub. nom. *Panicum dichotomum* var. *nitidum* in Herb. Oakes; Canton *E.* & *C. E. Faxon*, June 4, 1880; Mt. Holyoke, *J. Blake*, June, 1858; Brookline, *C. W. Swan*, June 22, 1881; Roxbury, *C. W. Swan*, July 23, 1882; Waltham, *W. Deane*, June 22, 1884; Nantucket, *W. Deane*, July 11, 1884.

§ § Spikelets less than 3 mm. in length: plants usually rather soft in texture.

= Whole plant smooth or nearly so.

‖ Nodes bearded.

20. Panicum barbulatum Michx. Fl. Bor. Am. 1: 49. 1803. (*Panicum discolor* Spreng. Mant. Fl. Hal. 31. 1807 — Muhl. Gram. 114. 1817: *P. heterophyllum* Muhl. Trans. Am. Phil. Soc. 3: 160. 1793, nomen nudum: *P. heterophyllum* Schreb. in Muhl. Gram. 115. 1817, as synonym; *P. heterophyllum* Bosc. in Nees, Agrost. Bras. 227, 1829; *P. microcarpon* Muhl. in Ell. Sk. Bot. S. C. and Ga. 1: 127, Jan. 1817, not Muhl. Gram. 111. June, 1817: *P. nitidum barbatum* Torr. Fl. U. S. 1: 146. 1824; *P. dichotomum barbulatum* A. Gray, Man. Bot. 580. 1848; *P. pubescens barbulatum* Britt. Cat. Pl. N. J. 280. 1889.)— An erect or ascending, nearly glabrous perennial, 4–9 dm. high, with strongly barbed nodes and small glabrous spikelets. Culms at first simple, erect, later profusely branched throughout, becoming prostrate or leaning; nodes strongly retrorsely barbed. Sheaths shorter than the internodes, rather loose, glabrous except on the usually ciliate margins and often slightly bearded apex, those of the primary stem often irregularly marked with white spots; ligule a short ciliate ring or nearly obsolete; leaf-blades glabrous, those of the primary stem lanceolate, acute, narrowed to the truncate or rounded base, 8–14 cm. long, 8–12 mm. wide, spreading, the lower ones usually reflexed, those of the slender branches much smaller,

crowded, 2 to 5 cm. long, 2 to 4 mm. wide. Primary panicle exserted, 8–12 cm. long, ovoid, its capillary branches ascending, the lower ones 6–8 cm. long; secondary panicles much smaller, lax, few-flowered, 3–4 cm. long. Spikelets ovate, acute or obtuse, 1.5 mm. long, on elongated, capillary, sparingly scabrous pedicels; first glume about one-third as long as the spikelet, acute; second and third glumes green or purplish, glabrous or sometimes pubescent, faintly 7-nerved.

General distribution: in damp soils, thickets, etc. Massachusetts, Ohio, Illinois, and Missouri, south to Florida and Texas. May to September.

Massachusetts: Nonquit, woods, 36 *E. L. Sturtevant*, Aug. 24, 1888, July 19, 1889, and August 4, 1889; Dartmouth, *E. L. Sturtevant*, Sept. 15, 1899; West Quincy, Blue Hills, *J. R. Churchill*, July 11, 1891; Blue Hills, *W. H. Manning*, August 11, 1894. Rhode Island: Providence, swamp, *J. F. Collins*, June 27, 1891. Connecticut: Hartford, frequent, 4 *A. W. Driggs*, July 27, 1900.

21. Panicum mattamusketense Ashe, Journ. E. Mitch. Sci. Soc. **15**: 45. 1898. (*Panicum discolor* var. *major* Muhl. Gram. 115. 1817, not *Panicum nitidum* var. *majus* Pursh, Fl. Am. Sept. **1**: 67. 1814). An erect, rather stout, somewhat tufted perennial, 6–12 dm. high, with rather thin, glabrous, lanceolate leaves, and pubescent spikelets. Culms glabrous, erect, simple or slightly branched below; nodes strongly bearded. Sheaths much shorter than the internodes, glabrous, or the lower one sparingly pilose, ciliate on the margins; ligule a short ciliate fringe; leaf-blades spreading, scabrous on the margins, otherwise smooth, 8–14 cm. long, 8–14 mm. wide, acuminate somewhat narrowed to the slightly clasping base, pubescent on the back where it joins the sheath. Panicle exserted, ovoid, 8–14 cm. long, branches fasciculate, spreading or ascending, the lower ones often flexuous. Spikelets ovate, often purplish, about 2.2 mm. long, first glume acute, about one-fourth as long as the spikelet; second and third glumes pubescent with scattered spreading hairs.

General distribution: In damp open woods, Massachusetts, North Carolina and Georgia, June to July.

Massachusetts: Wellesley, *W. P. Rich*, June 14, 1899.

‖ ‖ Nodes naked or with only a few spreading hairs.

Spikelets glabrous.

22. Panicum dichotomum Linn. Sp. Pl. 58. 1753? (*Panicum dichotomum viride* Vasey, U. S. Dept. Agr. Div. Bot. Bul. **8**: 30. 1889; *Panicum ramulosum viride* Porter, Bul. Torr. Bot. Club, **20**: 194. 1893.) — A slender, glabrous, somewhat wiry perennial, 2 to 6 dm. high, finally much branched above, with pale green spreading leaves and open panicles. Culms erect, slender, often purple; nodes smooth or with few long, weak hairs. Sheaths shorter than the internodes, smooth; ligule a short ciliate ring; leaf-blades thin, gla-

brous, spreading, linear-lanceolate, acuminate, gradually narrowing to the base, 3 to 8 cm. long, 2 to 6 mm. wide. Panicles ovate 4 to 8 cm. long, the branches slender, spreading, few-flowered, the lower ones often 5 or 6 cm. long; secondary panicles numerous, small, few-flowered. Spikelets oblong elliptical, nearly 2 mm. in length, glabrous, first glume very small, one-fourth as long as the spikelet or less; second and third glumes equal, green or purplish.

General distribution: in dry woodlands and thickets, Maine to Kentucky and Missouri, south to Texas, June to August.

Maine: Orono, *F. P. Briggs*, Aug. 1890; Bridgton, *J. Blake*, July 23, 1856. Vermont: Burlington, *L. R. Jones*, June 25, 1892; West Rutland, Twin Mountains, 1759 *W. W. Eggleston*, July 1, 1899. Massachusetts: Melrose, 289 *W. P. Rich*, July 4, 1894, 193 *W. P. Rich*, June 18, 1894; Cascade region, *W. P. Rich*, July 3, 1892, 193 *W. P. Rich*, July 1894; Blue Hills, *L. R. Jones*, Aug. 24, 1898; Malden, *W. P. Rich*, July 29, 1888 and July 16, 1895; Wellesley, *W. P. Rich*, June 14, 1899; Framingham, shady woods, *W. Deane*, July 3, 1884, also 753 *E. C. Smith*, Aug. 28, 1899 and Sept. 1897; Nonquit, 58, *E. L. Sturtevant*, June 14, 1889, and July 5, 1889; Dartmouth, 68 *E. L. Sturtevant*, July 31, 1889. Lowell, *C. W. Swan*, July 29, 1882; Middlesex Fells, Bear's den Road, *F. S. Collins*, July 4, 1887; West Quincy, *J. R. Churchill*, July 11, 1891; West Falmouth, *J. R. Churchill*, July 2, 1894; Andover, *J. Blake*, June 21, 1880; Mattapan, *J. R. Churchill*, June 21, 1890. Connecticut: New Haven, *J. A. Allen*, July 14, 1877; Fairfield, sandy dry soil, *E. H. Eames*, July 24, 1893.

\+ + Spikelets pubescent.

× Spikelets ovate or elliptical; ligule present.

¶ Lower internodes puberulent.

23. Panicum bicknellii Nash, Bul. Torr. Bot. Club, **24**: 193. 1897.—An erect or ascending, nearly glabrous perennial, 2 to 4 dm. high, with erect or ascending leaves and few-flowered ovate panicles 6 to 8 cm. long. Culms slender, at length sparingly branched, the lower internodes puberulent, the nodes sparingly or rather densely bearded. Sheaths generally longer than the internodes, ciliate on the margins; ligule a fringe of very short hairs; leaf-blades linear, acuminate at the apex, narrowed toward the ciliate base, scabrous on the margins, the primary ones 8 to 16 cm. long, 5–10 mm. wide, the uppermost longest. Axis of the panicles scabrous as are also the ascending, slightly flexuous branches. Spikelets obovate, 2.5–3 mm. long; first glume triangular, acute, one-fourth as long as the spikelet: second and third glumes 7-nerved, pubescent with short spreading hairs.

General distribution: in dry rocky woods, Connecticut to Pennsylvania, July to August.

Connecticut: Norwich, rocky woods. Lamb's Hill, 15 *C. B. Graves*, July 1, 1899.

The puberulent culms and nodes bearded with ascending or appressed hairs, as well as the characters presented by the panicle and spikelets suggest a very close relationship with *Panicum commutatum*, in fact *P. bicknellii* might with some propriety be treated as a narrow-leafed variety of that species.

24. Panicum commutatum R. & S. Syst. **2**: 242. 1817. (*P. nervosum* Muhl. Gram. 117. 1817; *P. ashei* Pearson in Ashe, Journ. E. Mitch. Soc. **15**: 35. 1898.

A more or less caespitose, erect, and finally branching perennial with rather stout culms 3 to 10 dm. high, broad lanceolate leaves, and diffuse panicles. Culms glabrous or puberulent; nodes glabrous or pubescent with erect hairs. Sheaths striate, generally shorter than the leaf-blades, the margins more or less ciliate otherwise glabrous or with a more or less densely pubescent ring on the back at the apex; ligule very short, minutely ciliate; blades more or less cordate-clasping at the base, 5–13 cm. long, less than 1 cm. to nearly 3 cm. broad (usually about 6 cm. long by 1 cm. broad); margins scabrous, ciliate towards the base, surfaces glabrous, long-acuminate pointed. Basal leaves 3–10 cm. long and 1–2 cm. wide, usually nearly as broad as long. Panicles broadly ovate or pyramidal, 5–12 cm. long; branches spreading, more or less flexuous, rather few-flowered, glabrous or nearly so. Spikelets oblong, obtuse, 2.5–3 mm. long; first glume one fourth to one third as long as the second, obtuse, nerveless; second and third glumes pubescent or thinly pilose, 7-nerved, as long as or slightly exceeding the smooth and obtuse fourth glume.

General distribution: Southern New England, and New York southward to Florida and westward to Mississippi and Missouri.

Massachusetts: Melrose, *W. P. Rich*, July 3, 1892, 291 *W. P. Rich*. July 21, 1894, and 235a, June 16, 1895; Boston, rocks near Muddy-pond woods, *C. W. Swan*, June 5, 1894; Blue Hill, *W. H. Manning*, Aug. 23, 1894; Weston, *E. F. Williams*, Sept. 29, 1895; West Quincy, *J. R. Churchill*, Sept. 9, 1894. Connecticut: Montville, 88 *C. B. Graves*, June 19, 1897.

This species varies a good deal in its habit of growth, some forms being slender, others quite robust. The leaves also vary a good deal in width, but in all they are many-nerved and glabrous except as above indicated. The sheaths are nearly always glabrous, but in a few southern forms the upper portion of the sheath is somewhat pilose with appressed hairs. The ring of pubescence at the summit of the sheath on the back is quite characteristic of this species. In the type the culms are glabrous as are the nodes, but in the form which extends into New England ranging southward to Tennessee and Florida the culms, at least the lower internodes, are puberulent,

and the nodes often quite densely pubescent with erect, appressed hairs. As pointed out by Elliott this species has some resemblance to *Panicum latifolium* L., but it is usually taller, its leaves narrower and less cordate at the base, and panicle larger with more numerous and much smaller spikelets which do not form regular racemes on the lower branches. *Panicum ashei* Pearson (*P. commutatum minor* Vasey), is based upon a reduced and late, branching form of this species. The specimens from Montville, Conn., No. 88 C. B. Graves in National Herbarium are exactly matched by specimens from Virginia and from Tennessee.

¶ ¶ Culms smooth throughout.

25. PANICUM BOREALE Nash, Bul. Torr. Bot. Club, 22: 421. 1895. — An erect, finally branching, glabrous perennial 3–6 dm. high with lanceolate, pale green leaves and open, spreading panicles 4–10 cm. long. Culms smooth, often geniculate below; nodes glabrous; sheaths shorter than the internodes, glabrous, somewhat ciliate on the margin; ligule short, ciliate; leaf-blades 5–13 cm. long, 8–15 mm. wide, rather thin, erect, glabrous, truncate or rounded at the sparsely ciliate base, acuminate. Panicle ovate, its branches 2–5 cm. long, spreading or ascending. Spikelets 2 mm. long, elliptical, about equaling their pedicels; first glume ovate, obtuse, about one-third as long as the spikelet; second and third glumes seven-nerved, slightly pubescent with short spreading hairs; flowering glume oval-acute, about 1.5 mm. long.

General distribution: moist soil, low thickets and bogs, Newfoundland and Ontario to Connecticut, New York, Michigan, and Minnesota, June to August.

MAINE: Dover, 514 *M. L. Fernald*, June 28, 1894, and in gravelly thicket, 239 *M. L. Fernald*, June 26, 1895, Orono, *M. L. Fernald*, July 4, 1890, thickets, *M. L. Fernald*, June 30, 1892, low ground, *M. L. Fernald*, July 5, 1892, 516 *M. L. Fernald*, June 30, 1893, sandy river thicket, *M. L. Fernald*, July 12, 1897, *F. P. Briggs*, Aug. 1890; East Auburn, *E. D. Merrill*, July, 1898; Cumberland, *J. Blake*, July 3, 1857; Wells, *J. Blake*, June 21, 1884; Somesville, Mt. Desert, *Rand & Redfield*, June 17, 1889 (*Panicum laxiflorum* of the Flora of Mt. Desert Island); North Berwick, *J. C. Parlin*, July 17, 1891, and again in 1894; Fort Fairfield, rocky river bank, *M. L. Fernald*, July 4, 1893, *Kate Furbish*, 1881; Foxcroft, cedar swamp, 515 *M. L. Fernald*, June 25, 1890: St. Francis, *M. L. Fernald*, Aug. 5, 1893; Denmark, *W. H. Merrill*, 1894; Old Orchard, peat bog, *M. L. Fernald*, July 11, 1896, a robust form which suggests *Panicum clutei* Nash.; Manchester, *F. Lamson-Scribner*, 1895. NEW HAMPSHIRE: Whitefield, *W. Deane*, July 3, 1896; Shelburne, wet sand, *W. Deane*, July 31, 1884; Tamworth Iron Works, *C. W. Swan*, Aug. 5, 1888; North Groton, *J. Blake*

July, 1879; Jaffrey, dry sandy soil in woods, 338 *B. L. Robinson*, July 5, 1897, also in sphagnum bog, 338a *B. L. Robinson*, July 10, 1897. VERMONT: Sterling Mountain, *W. W. Eggleston*, Aug. 1, 1893; Middlebury, low clay meadow, *Ezra Brainerd*, June 26, 1899; New Haven Junction, moist meadow, 17 *Ezra Brainerd*, June 25, 1897; Newfane, on river banks, *A. J. Grout*, July 2, 1895; Brattleboro, *L. R. Jones*, July 4, 1895; Charlotte, *C. G. Pringle*, July 5, 1880, a robust form with purplish panicles and narrower leaves than in the type. MASSACHUSETTS: Sharon, meadows, *W. P. Rich*, June 17, 1896; Framingham, on gravelly banks, 732, 733 *E. C. Smith*, June 23, 1899, June 25, 1897, and June 17, 1899; Billerica, *C. W. Jenks & C. W. Swan*, Aug. 18, 1889; Wilmington, *F. S. Collins & C. W. Swan*, July 25, 1887, an unusually robust form; Revere, Oak Island, *H. A. Young*, July 2, 1882, also *W. P. Rich*, July 9, 1899. CONNECTICUT: Griswold, shaded tussocks, edge of cedar swamp near Jewett City, 77 *C. B. Graves*, June 16, 1899; Waterford, wet spagnous meadows, Fog Plain, 82 *C. B. Graves*, Aug. 6, 1897.

26. PANICUM WERNERI Scribn. in Britt. & Brown Illus. Flora 3: 501. 1898.

A slender, erect, caespitose perennial 2–4 dm. high with narrowly lanceolate, very acute leaves and diffuse, ovoid or pyramidal panicles 5–7 cm. long. Culms simple or sparingly branched below, glabrous; nodes glabrous or sparingly pilose with rather long, spreading hairs. Sheaths glabrous, striate, sometimes ciliate on the margins near the apex. Ligule a dense fringe of hairs about 1 mm. long. Blades 5–14 cm. long 4–6 mm. wide, scabrous on the margins and upper surface, glabrous beneath, ciliate with a few long hairs near the abruptly contracted base. Panicle branches flexuous, spreading, glabrous, the lowermost 3–4 cm. long. Spikelets oblong, ovoid, obtuse, 2 mm. long; first glume about one-fourth the length of the spikelet, broadly rounded-obtuse, nerveless; second and third glumes 7-nerved, thinly pubescent with very short hairs.

General distribution: Southern New England to Ohio.

CONNECTICUT: Ledyard, gravelly soil of kames, near Stoddard's wharf, 16 *C. B. Graves*, June 27, 1899; Voluntown, dry sandy soil in rather open woods, 17 *C. B. Graves*, July 5, 1899.

This species may be readily distinguished from *P. linearifolium* by its more remote culm leaves which are abruptly rounded near the base and do not taper from near the middle downwards. The panicle is finally much exserted beyond the uppermost leaf and the panicle branches and pedicels are glabrous. In *P. linearifolium* the panicle branches and pedicels are conspicuously scabrous and the pedicels are less spreading. This species differs from *P. bicknellii* in its glabrous culms, rather more remote leaves, smaller spikelets and glabrous panicle branches.

27. PANICUM NITIDUM Lam. Tabl. Encycl. 1: 172. 1791; Encycl.

4: 738 (err. typ. 748.) 1797. (*Panicum* — Muhl. Descr. 125. 1817 number 37 (sine nomine); *Panicum spretum* Schult. Mant. **2**: 248. 1824; *Panicum nitidum* forma *densiflorum* Scribn. in Rand & Redfield, Fl. Mt. Desert Isl. 174. 1894; *Panicum eatoni* Nash Bul. Torr. Bot. Club, **25**: 814. 1898; *Panicum paucipilum* Nash, ibid., **26**: 573. 1899.)

A glabrous, tufted perennial 6 to 10 dm. high, with erect, narrowly lanceolate leaves, and exserted, contracted panicles, bearing numerous, small, purplish, pubescent spikelets. Culms at first simple, becoming dichotomously branched, generally purplish; nodes smooth; sheaths much shorter than the internodes, glabrous, striate, usually slightly ciliate on the margins above; ligule a dense ring of hairs about 2 mm. long; leaf-blades 5 to 10 cm. long, 3 to 10 mm. wide, acuminate, glabrous, or with few papillate hairs at the base. Panicle finally long-exserted, generally contracted, 5 to 13 cm. long; rachis glabrous; branches erect or ascending. Spikelets ovate, 1.4 to 1.6 mm. long; first glume small, one-fourth to one-third as long as the spikelet, glabrous, 1-nerved; second and third glumes pubescent with spreading hairs, often densely so, 7-nerved; flowering glume about 1.3 mm. long.

General distribution: In wet or damp soil, especially near the coast, Maine to Indiana, south Mississippi and Texas. For discussion of this species see Scribn. & Merrill, U. S. Dept. Agr. Div. Agros. Bul. **24**: 31. 1901.

Maine: Mt. Desert, shore of Ripples Pond, *E. L. Rand*; York, shore of Chase's Pond, 510 *M. L. Fernald*, July 16, 1891. Massachusetts: Stoneham, meadow, border of Spot Pond, 336 *W. P. Rich*, July 4, 1894, gravelly path, border of Doleful Pond, 320 *W. P. Rich*, July 4, 1894, meadows, west border of North Reservoir, 349 *W. P. Rich*, July 7, 1894; Wilmington, damp sandy ground in a cranberry bog, *W. P. Rich*, July 18, 1899; Holbrook, wet meadows, *W. P. Rich*, June 18, 1899; Lynn, border of pond, *W. P. Rich*, Aug. 25, 1889; West Roxbury, *W. P. Rich*, Aug. 27, 1880; West Quincy, meadow, *W. P. Rich*, Sept. 3, 1894; South Framingham, *E. L. Sturtevant*, July 3, 1890 and July 6, 1890; Nonquit, 54 *E. L. Sturtevant*, June 26, 1889; Westford, Nebasset Pond, *C. W. Swan*, July 7, 1880; Wakefield, *J. R. Churchill*, July 22, 1886; Milton, brook above Thatcher St., *J. R. Churchill*, July 10, 1892; Concord, low open fields, *W. Deane*, July 6, 1886. Rhode Island: Johnson, *J. W. Congdon*, Sept. 27, 1871. Connecticut: Waterford, wet meadows near Miner's Lane, 87 *C. B. Graves*, July 15, 1898, open damp ground, *C. B. Graves*, 1895; Franklin, *C. B. Graves*, July 3, 1899.

28. Panicum clutei Nash, Bul. Torr. Bot. Club, **26**: 569. 1899.— A tufted, glabrous perennial 6–9 dm. high, with ascending, lanceolate leaves and exserted, ovate, panicles 6–10 cm. long. Culms rather

stout, simple or becoming somewhat branched; nodes smooth, or the lower ones very slightly bearded; sheaths rather loose, minutely pubescent at the apex, usually more or less ciliate on the margin, the basal ones somewhat pubescent; ligule a dense ring of hairs about 0.3 mm. long; leaf-blades firm, smooth on both surfaces, serrulate-scabrous on the margins, 7–14 cm. long, 7–12 mm. wide, the basal ones much shorter. Panicle-purplish, its ascending branches smooth. Spikelets ovate, acute, about 2.3 mm. long; first glume broadly ovate, obtuse or acute, 1-nerved, glabrous or nearly so; second and third glumes finely and sparingly pubescent with short hairs, 9-nerved; flowering glume ovate, about 2 mm. long.

General distribution: In dry, sandy soil, Massachusetts, New Jersey, July to August.

Massachusetts: Nantucket, *J. R. Churchill*, July 6, 1886, also *C. W. Swan*, July, 1886; West Falmouth, *J. R. Churchill*, June 28, 1894 (not typical).

This very distinct species was described from specimens collected in New Jersey, The above are the only localities known for this species outside of the states of Delaware and New Jersey.

× × Spikelets spherical; ligule obsolete.

29. Panicum sphaerocarpon Ell. Sk. Bot. S. C. and Ga. 1: 125. 1817. (*P. microcarpon sphaerocarpon* Beal, Grasses N. A. 2: 137. 1896).—A tufted, erect, or ascending, rather rigid perennial 2–6 dm. high, with firm, erect, leaves and diffuse, many-flowered panicles. Culms simple or finally much branched near the base, smooth; nodes generally bearded with short, ascending hairs, rarely smooth; sheaths usually shorter than the internodes, sometimes exceeding them, glabrous except on the ciliate margin; ligule obsolete; leaf-blades 5–10 cm. long; 5–15 mm. wide, cordate-clasping at the base, very acute, glabrous beneath, scabrous above and on the cartilaginous margins which are usually sparingly ciliate below; basal leaves broadly ovate, 1–3 cm. long, many-nerved. Panicle ovoid or pyramidal, 5 to 8 or rarely 10 cm. long; branches slender, compound to the base; pedicels usually much exceeding the spikelets. Spikelets nearly spherical, purplish, 1.5 to 1.8 mm. long; first glume minute; second and third glumes 7 to 9-nerved, minutely pubescent; flowering glume very smooth, obtuse.

General distribution: dry soil, Massachusetts to Southern Ontario and Illinois, south to Florida, Mississippi, and Texas (Mexico). April to October.

Massachusetts: Framingham, *E. L. Sturtevant*, July 6, 1890. *E. C. Smith*, June 21, 1892 and Sept. 1897, also 748, *E. C. Smith*, July 21, 1899; Medford, wet border of South Reservoir, 342, *W. P. Rich*, July 7, 1894, 386 N. E. Bot. Club, July 23, 1894; Stoneham, wet border, north end of South Reservoir, 343 *W. P. Rich*, July 7, 1894; Sharon, *W. P. Rich*, July 12, 1896; Woburn, gravel pit, *E.*

F. Williams, Nov. 20, 1898, also *E. F. Williams*, *M. L. Fernald*, Nov. 21, 1898; Dorchester, Mattapan, *J. R. Churchill*, Aug. 2, 1884; West Quincy, path to "crag," Blue Hill, *J. R. Churchill*, July 11, 1891. Boston, new land "introduced plant" *C. W. Swan*, Sept. 29, 1886, Back Bay Park, *C. W. Swan*, Sept. 9, 1888; Malden, Middlesex Fells, *F. S. Collins*, July 4, 1887; Nantucket, *C. W. Swan*, July, 1886; Winchester, *C. W. Swan*, July 19, 1890. CONNECTICUT: Waterford, dry, sandy woods, Fog Plain, 85, *C. B. Graves*, July 9, 1898.

= = Whole plant more or less pubescent.

|| Spikelets 2 mm. long.

30. PANICUM ATLANTICUM Nash, Bul. Torr. Bot. Club, **24**: 346. 1897. (*Panicum haemacarpon*, Ashe, Journ. E. Mitch. Sci. Soc. **15**: 55. 1898.)—A slender erect, much-branched perennial, 3 to 5 dm. high, with culm, sheaths, and erect linear lanceolate leaves, papillate. pilose with long, white, spreading hairs. Nodes bearded with spreading hairs, with a naked ring about 1 mm. wide below each node. Sheaths shorter than the internodes; ligule a ring of hairs 2 to 5 mm. long; leaf-blades erect, rigid, thickish, 3 to 10 cm. long, 4 to 7 mm. wide, acuminate, scabrous on the margins. Panicles ovate or orbicular, 4 to 7 cm. long, 3 to 7 cm. wide, its main axis somewhat pilose at the base. Spikelets many on long hispidulous pedicels, obovate, 2 mm. long, obtuse; first glume about one-half as long as the spikelet, ovate, acute; second and third glumes equal, densely pubescent with short spreading hairs.

General distribution: in dry open woods, Massachusetts to Indiana, and Missouri, south to Mississippi, June to August.

MASSACHUSETTS: Boston, Parker Street, *C. W. Swan*, June 19, 1885; Framingham, *E. C. Smith*, June 29, 1898. CONNECTICUT: Franklin, dry wooded hillsides, Ayer's Gap, 14 *C. B. Graves*, July 3, 1899.

|| || Spikelets about 1.5 mm. long.

\+ Plants pubescent with spreading white hairs.

31. PANICUM UNCIPHYLLUM Trin. Gram. Pan. 242. 1826. (*Panicum pubescens* of American authors, not of Lamarck).

An erect or ascending, caespitose, at length much branched pubescent perennial, 3 to 8 dm. high, with lanceolate leaves, exserted ovate panicles and pubescent spikelets. Culms pilose with weak hairs; nodes sparingly bearded or smooth; sheaths striate, loose, usually shorter than the internodes, pilose with spreading or ascending hairs; ligule a long-ciliate fringe; leaf-blades ascending, firm or even rigid, acuminate, slightly narrowed at the rounded or truncate base, densely pubescent beneath, with short spreading hairs, smooth above or often with scattered papillate hairs, 4 to 10 cm. long, 5 to 12

mm. wide. Panicles 5 to 10 cm. long, usually purplish, the branches spreading, generally few-flowered. Spikelets elliptical, obtuse, 1.5 mm. long; first glume small, about one-fourth as long as the spikelet; second and third glumes equal, pubescent with spreading hairs.

General distribution: in dry or wet soil, New Brunswick to the Pacific coast and south to Texas. May to September.

MAINE: North Berwick, *M. L. Fernald*, Sept. 25, 1897; Southport, moist thicket, *M. L. Fernald*, July 31, 1894; Augusta, *E. C. Smith*, July 22, 1891; Wells Beach, *M. L. Fernald*, July 23, 1898, a robust form; Pushaw Lake "Dollar Island," *Aaron Young, Jr.*, Aug. 1845; Gilead, *Kate Furbish*, July 1897; Wells, *J. Blake*, June, 1858. VERMONT: Willoughby Mt., *G. G. Kennedy*, July 11, 1896, *H. Mann* 1862, *E. & C. E. Faxon*, Aug. 11, 1896; Middlebury, clay meadow, *E. Brainerd*, June 26 and July 24, 1899; Beldens Falls, *E. Brainerd*, July 4, 1899; Leicester, Lake Dunmore, *E. Brainerd*, June 22, 1899; New Haven Junction, *E. Brainerd*, June 25, 1897; Hartland, *B. P. Ruggles*, 1897; Charlotte, *C. G. Pringle*, July 5, 1880; Burlington, *L. R. Jones*, 1898, *A. J. Grout*, June 30, 1893. MASSACHUSETTS: Mendon, *H. G. Jesup*, July 7, 1870; Waltham, gravelly soil, *W. Deane*, June 22, 1884; West Quincy, *J. R. Churchill*, July 4, 1891; Cambridge, low ground, Fresh Pond, *W. Deane*, Aug. 28, 1883; Framingham, *E. C. Smith*, July 19, 1892, 737 *E. C. Smith*, July 21, 1899; Boston, Back Bay Park, *C. W. Swan*, Sept. 25, 1888; Ipswich, *Oakes*, no date; Hyannis, *J. R. Churchill*, July 4, 1896; Melrose, 235 *W. P. Rich*, June 28, 1894; Medford, 215 *W. P. Rich*, June 23, 1894; Holbrook, *W. P. Rich*, June 18, 1899; Stoneham, 341 *W. P. Rich*, July 7, 1894; Walpole, *W. P. Rich*, June 7, 1896; Revere, Oak Island, *H. A. Young*, June, 23, 1882, *W. P. Rich*, July 4, 1888. RHODE ISLAND: Providence, *J. F. Collins*, June 15, 1891. CONNECTICUT: Groton, 75 *C. B. Graves*, June 19, 1899; Middlebury, *W. M. Shepardson*, June 25, 1896.

Recent examination of the type of *Panicum pubescens* in Lamarck's herbarium, Muséum d' Histoire Naturelle de Paris, shows that this species has been misinterpreted by American authors — see Scribner & Merrill, U. S. Dept. Agr. Div. Agros. Bul. **24**: 36. 1901.

In the Herbarium of Columbia University is a specimen referable to this species labelled in Torrey's handwriting "*Panicum unciphyllum* Trin. in Lit." It is evident that this specimen was named by Trinius and while it is very possible that the plant in question may be different from the type of the species, we feel justified in taking up *Panicum unciphyllum*, rather than applying a new name to this very common grass. It is probable that an older tenable name will be found when the obscurity of many of the older species is cleared up, which can only be accomplished by examination of the types in the various European herbaria.

This species is exceedingly variable and many varieties or forms might be characterized on the basis of size and habit. The follow-

ing varieties and forms are recognized, a list which might be greatly extended, but in so doing it would only add more confusion to this difficult group, as we believe that no one would be able to recognize the forms described, no matter how minutely and carefully they might be characterized.

PANICUM UNCIPHYLLUM **implicatum** (Scribn.) (*Panicum implicatum* Scribn. U. S. Dept. Agr. Div. Agros, Bul. 11: 43. *fig. 2.* 1898).

This form is characterized by its weak culms, small leaves, and small implicate panicles. Leaves 3 to 5 cm. long, 3 to 6 mm. wide, pilose on both surfaces with rather longer hairs than in the species. Spikelets as in the species. In the type collection this form was found to be growing in patches of considerable extent, which were conspicuous for their reddish or purplish color. On account of intermediate forms this variety can only be arbitrarily separated from the species.

General distribution: In marshes and wet soil, Maine to Illinois, south to North Carolina, June to August.

MAINE: Cape Elizabeth, salt marsh, *F. Lamson-Scribner*, July 26, 1895 (type); Orono, *M. L. Fernald*, Sept., 1890; East Auburn, moist pastures, *E. D. Merrill*, July 23, 1896, and in open woods, Aug. 1898; Manchester, *F. Lamson-Scribner*, July, 1896; Foxcroft, *M. L. Fernald*, July 25, 1894; Farmington, *M. L. Fernald*, July 8, 1896. VERMONT: Charlotte, low lands, *C. G. Pringle*, July 5, 1880. MASSACHUSETTS: South Framingham, *E. L. Sturtevant*, July 3, 1890, also *E. C. Smith*, Sept. 1899; Stoneham, meadow, border of Spot Pond, 335 *W. P. Rich*, July 4, 1894; gravelly path, border of Doleful Pond, 319 *W. P. Rich*, July 4, 1894; Winchester, *C. W. Jenks* and *C. W. Swan*, July 19, 1890; Milton, *J. R. Churchill*, June 27, 1891. Linden, *W. P. Rich*, Aug. 1, 1880; Sharon, *W. P. Rich*, July 5, 1895; Truro, *W. P. Rich*, July 4, 1895. CONNECTICUT: 78 *C. B. Graves*, June 16, 1899.

PANICUM UNCIPHYLLUM MERIDIONALE (Ashe) (*Panicum meridionale* Ashe, Journ. E. Mitch. Sci. Soc. 15: 59. 1898; *Panicum filiculme* Ashe, l. c.)

This form is scarcely worthy of specific rank and can only be separated arbitrarily even as a variety, on account of intermediate forms. It is characterized by its small size, 10 to 30 cm. high, small leaves and panicles. Leaves 2 to 4 cm. long, about 4 mm. Panicle 2 to 5 cm. long. Spikelets as in the species.

General distribution: in dry soils, Massachusetts to North Carolina and Georgia, June to August.

MASSACHUSETTS: Hyannis, dry sandy soil, *J. R. Churchill*, July 4, 1896; *J. R. Churchill*, July 2, 1882; Nantucket, *L. L. Dame* (1887?); no locality, *C. W. Swan.*

Panicum filiculme Ashe cannot be distinguished from this form either by the original descriptions or by comparison of typical material.

Panicum unciphyllum forma **prostratum**. — A low, spreading, much branched form with lax, very few-flowered panicles, thin leaves, and spikelets nearly 2 mm. in length. Culms slender, some of them trailing. Panicle branches remote, spreading, few-flowered. — Dry woods, South Berwick, Maine, *M. L. Fernald*, September 26, 1897.

Panicum unciphyllum forma **pilosum**. — A slender, very pubescent, rather flaccid form, with small, ovate, exserted panicles, about 3 cm. long, erect leaves, which are pilose on both sides with scattered, long white hairs and spikelets nearly 2 mm. in length. — Dry woods, Orono, Maine, 501 *M. L. Fernald*, July 7, 8191.

The above two forms are readily distinguished from the species and are perhaps even more worthy of varietal rank than the forms treated above as varieties.

32. Panicum lanuginosum Ell. Sk. Bot. S. C. and Ga. 1 : 123. 1817. (*Panicum tennesseense* Ashe, Journ. E. Mitch. Sci. Soc. 15 : 52. 1898).—An erect or ascending finally much branched pubescent perennial 1.5–8 dm. high, with weak culms, very thin leaves and slightly exserted, usually many-flowered panicles. Culms geniculate below, papillate-pilose with few weak, spreading hairs ; nodes yellow sparingly bearded with few, reflexed hairs, and generally with a smooth ring immediately below ; sheaths shorter than the internodes, rather loose, striate, papillate-pilose with scattered spreading hairs ; leaf-blades spreading or ascending, thin, soft, lanceolate, 3–8 cm. long 4–10 mm. wide, acute, slightly narrowed to the rounded base, scabrous on the margins, appressed-pubescent beneath with scattered, short, papillate hairs, and often also on the upper surface, giving the leaves a peculiar lustre or sheen. Panicles 4–8 cm. long, broadly ovate or sub-pyramidal, pale green ; rachis pilose ; branches capillary, spreading, the lower ones often densely flowered, and interlaced giving the panicle a characteristic matted appearance ; secondary panicles included, few flowered. Spikelets ovate, obtuse ; first glume hyaline, acute, one-fourth as long as the spikelet ; second and third glumes, rather strongly striate, pilose with spreading hairs.

General distribution : in low thickets, woods and swamps, Maine to Illinois, south to Kansas and Mississippi, May to August.

Maine : Orono, low thicket, *M. L. Fernald*, July 7, 1892, and in sandy river thicket, July 12, 1897 ; Carrying Place Plantation, *M. L. Fernald*, July 29, 1892, an unusally smooth form. Vermont : Wallingford, *E. Brainerd*, Sept. 6, 1881 ; Middletown, *E. Brainerd*, June 13, 1880. Massachusetts : Framingham, *E. C. Smith*, July 24, 1899 ; Revere, Oak Island, *H. A. Young*, July 16, 1882 ; Revere, *W. P. Rich*, July 9, 1899 ; Melrose, Cascade Region, *W. P. Rich*, July 17, 1892 ; Malden, *H. A. Young*, June, 1879 ; East Gloucester, *C. W. Swan*, July 14, 1881 ; Beaver Brook Reservoir, *C. W. Swan*, July 6, 1894 ; Happy Valley, Stony Brook Reservoir, *W. H. Manning*, June 17, 1895. Rhode Island : Providence, *T. J. Battey*,

1886. CONNECTICUT: New London, *C. B. Graves*, 1898; Portland, *F. Wilson*, 1897.

This species is characterized by its lax habit of growth, thin leaves, which generally have a peculiar lustre or sheen, pale green, generally somewhat implicate panicles, at least in herbarium specimens, and long-pubescent spikelets. It is very closely related to *Panicum unciphyllum*, being distinguished by the characters noted above. *Panicum lanuginosum* is extremely variable and often can only be separated arbitrarily from the related species — it is possible that it should be considered only as a variety of the preceding species.

† † Plants pubescent with very short appressed hairs or only puberulent.

33. PANICUM COLUMBIANUM Scribn. U. S. Dept. Agr. Div. Agros. Bul. 7: 78. *fig. 60.* 1897. (*Panicum psammophilum* Nash, Bul. Torr. Bot. Club, **26**: 576. 1899.)—A slender, erect, tufted, finally much branched perennial, 2–4 dm. high, with firm, short, lanceolate leaves, and small flowered, oblong or subpyramidal usually purplish panicles, 2–3 cm. long. Culms usually purple, appressed-hirsute or puberulent below, puberulent above: nodes with few short hairs, similar to those of the culm; sheaths shorter than the internodes, appressed-pubescent, the basal ones with long hairs, the upper and those of the branches with very short hairs, rarely nearly smooth; ligule a dense ring of hairs about 1 mm. long; leaf blades erect or ascending, thick, rather rigid, serrulate on the cartilaginous margins, puberulent beneath, the ovate, lanceolate basal ones and occasionally also those on the culm with a few very long scattered erect hairs on the upper surface, the primary blades 2–5 cm. long, 2–5 mm. wide, those of the branches smaller. Axis and the usually ascending branches of the panicle puberulent. Spikelets broadly obovate, 1.3–1.5 mm. long, rarely slightly larger, obtuse, the first glume about one-third as long as the spikelet, 1-nerved, acute or obtuse; second and third glumes densely pubescent 7-nerved, the second usually a little shorter than the third.

General distribution: in dry sandy fields, sandy lake shores and especially near the coast from Maine to Virginia, May to August.

MAINE: St. Francis, gravelly shores, 166 *M. L. Fernald*, Aug. 5, 1893; Fort Fairfield, *M. L. Fernald*, July 14, 1893; South Berwick, *J. C. Parlin & M. L. Fernald*, July 14, 1896; Island Falls, *M. L. Fernald*, Aug. 26, 1897. NEW HAMPSHIRE: Manchester, *F. W. Batchelder*, 1895 (a large form). VERMONT: Burlington, sandy pine clearing, back of St. Marys Academy, "*J. E. H.*", June 25, 1898; "*C. E. S.*", 1893. Lake Champlain, sandy bank on lake shore between Rock Point and Appletree Point, *Ezra Brainerd*, June 16, 1898; South Burlington, *Mrs. Nellie Flynn*, July 5, 1896; Rutland, 1756, 1758 *W. W. Eggleston*, June 12, 1899. MASSACHUSETTS:

Truro, sandy roadside in Dyers Hollow, *W. P. Rich*, July 21, 1888, July 3, 1895, and in sandy fields, Aug. 5, 1896; Nantucket, sandy shore, Gibbs Pond, *W. Deane*, Sept. 11, 1885; Stoneham, wet soil near South Reservoir (843 in part) *W. P. Rich*; Framingham, *E. C. Smith*, June 8, 1899 and 738 *E. C. Smith*, July 21, 1899; South Dennis, 11 *E. Brainerd*, Aug. 22, 1877; Nantasket Beach, *E. Brainerd*, June 11, 1896. CONNECTICUT: Waterford, dry sandy woods, Fog Plain, *C. B. Graves*, July 5, 1898 and in hemlock grove at "Precipice" June 20, 1898.

§ III. ECHINOCHLOA.

Spikelets densely imbricate, in thick, three- to four-ranked racemes, which are alternate on the common rachis, sessile or short pedicellate; second and third glumes very acute, muricate-hispid generally bearing a long scabrous awn.

* Sheaths smooth.

34. PANICUM CRUS-GALLI Linn. Sp. Pl. 56, 1753. (*Echinochloa crus-galli* Beauv. Agrost. 53. 1812.)—A coarse, erect or ascending leafy annual, 3–12 dm. high, with densely flowered panicles. Culms smooth, often branching near the base; sheaths loose, very smooth, ligule none; leaves rather broad, flat, 0.5 to 6 dm. long, smooth or scabrous on the surfaces, margins serrulate. Spikelets densely and irregularly crowded in 3 or 4 rows along one side of the short spike-like branches of the panicle, these branches 5 to 15 or 20, usually simple, the lower ones 2–8 cm. long, becoming shorter and more crowded above, usually erect or ascending. Spikelets about 3 mm. long; first glume one-fourth to one-half the length of the spikelet, acute or mucronate-pointed, 3-nerved; second and third glumes smooth, pubescent or muricate-hispid along the nerves; the second 5-nerved, awnless or short-awned; the third 7-nerved, at least near the tip awnless or sometimes long-awned, and with a palea in its axil; fourth or fruiting glume smooth, awnless, or short awn-pointed.

General distribution: a well known annual of rank growth common throughout the United States in cultivated and waste places. Introduced from Europe. Some apparently native forms, usually with long-awned spikelets are found along water courses in the south. July to October.

The awnless form has been called variety *muticum* by various authors.

MAINE: North Berwick, *J. C. Parlin*, Aug. 1898; Rumford, *J. C. Parlin*, 1890; Orono, *F. L. Harvey*, Aug. 1895, *F. P. Briggs*, Aug. 1890; East Auburn, *E. D. Merrill*, July, 1897; North Berwick, wet clay soil, *J. C. Parlin*, Aug. 26, 1894 (awnless form). NEW

HAMPSHIRE; Gilmanton, *J. Blake*, Aug. 21, 1876; Jaffrey, near dwellings, 566 *B. L. Robinson*, Aug. 7, 1898. VERMONT; Burlington, *L. R. Jones*, Oct. 12, 1889; Alburgh Springs, *W. W. Eggleston* & *L. R. Jones*, Aug. 30, 1893 (awnless form); Hartland, *B. P. Ruggles*, no date; Manchester, 272 *M. A. Day*, July 30, 1898. (awnless or nearly so). MASSACHUSETTS: Melrose, ditches near Long Pond, *W. P. Rich*, Aug. 29, 1891, a depauperate form; Revere, Oak Island, *H. A. Young*, Aug. 13, 1882 (awnless form) and Sept. 20, 1879; Blue Hills, *W. H. Manning*, Sept. 1, 1879; Charleston, *C. E. Perkins*, Aug. 16, 1880, South Framingham, *E. L. Sturtevant*, Aug. 10, 1890; Nonquit, *E. L. Sturtevant*, July 20, 1889; South Boston, *W. P. Rich*, Aug. 16, 1888 (awnless or nearly so); Lynnfield, borders of a bog, *W. P. Rich*, Aug. 21, 1892; Dedham, low ground near Wigwam Pond, *W. P. Rich*, Aug. 22, 1897, also *E. F. Williams*, Aug. 22, 1897; West Cambridge, *E. F. Williams*, Aug. 28, 1897 (awnless or nearly so). Cambridge, *W. Deane*, Aug. 24, 1883; Dorchester, *J. R. Churchill*, 1883, Deerfield, *J. R. Churchill*, Aug. 10, 1887. CONNECTICUT: Southington, *L. Andrews*, Aug. 2, 1898 (awnless form).

* * Sheaths hispid.

35. PANICUM WALTERI Pursh. Fl. Am. Sept. 1: 66. 1814. (*Panicum hirtellum* Walter, Fl. Car. 72, 1788, not All. 1785; *Panicum hispidum* Muhl. Descr. 107. 1817; *Panicum crus-galli* var. *hispidum* Torr. Fl. N. Y. 2: 424. 1843.

A robust, erect or ascending annual 9 to 18 dm. high, with the lower sheaths strongly papillose-hispid, and large long-bearded purplish panicles. Culms glabrous; sheaths loose; ligule obsolete or consisting only of a few hairs; leaf-blades 3 dm. long or more, 1 to 2 cm. wide, generally smooth beneath, strongly scabrous above. Panicle 15 to 45 cm. long, with 10 to 40 ascending or spreading branches. Spikelets densely crowded in 2 to 4 rows on one side of the scabrous hispid rachis, brownish-purple; second and third glumes about 3 mm. long, scabrous and strongly hispid, tipped with introrsely barbed awns, sometimes 3 to 6 cm. long; flowering glume ovate-lanceolate, acuminate.

General distribution: in marshes and ditches, generally near salt or brackish water, Massachusetts to Florida and Louisiana, August to October.

MASSACHUSETTS: South Boston, waste ground, *H. A. Young*, Sept. 20, 1878; Dorchester, marsh, *J. R. Churchill*, Aug. 30, 1884; Hyannisport, *J. M. Greenman*, Sept. 5, 1898, *J. R. Churchill*, Aug. 29, 1888, also *W. Deane*, same date and locality; Revere, *J. Blake*, Aug. 26, 1885; Medford, in brackish ditch, F. *S. Collins*, Sept. 15, 1887; Marthas Vineyard, *Sydney Harris*, Aug. 26, 1894; Swampscott, *C. W. Swan*, Sept. 16, 1888, a depauperate form. CONNECTI-

CUT: Madison, "*T. E. H.*" Sept. 10, 1898, in Herb. Univ. Vt.; New Haven, Gray Herbarium, no collector or date; Southington; *L. Andrews*, Aug. 14, 1898.

DOUBTFUL OR EXCLUDED SPECIES AND THOSE WHICH MAY BE EXPECTED IN SOUTHERN NEW ENGLAND.

PANICUM TEXANUM Buckley. This species has been collected in waste about cotton mills, at Malden, Massachusetts, *F. S. Collins*, September 15, 1888. Introduced from Texas and in all probability will not persist.

PANICUM ADDISONI Nash. There is a specimen of this grass in the Blake Herbarium, University of Maine, labelled as collected at Andover, Massachusetts, by J. Blake, July 29, 1882. It is evident there was a mistake in copying the label, and therefore this species is excluded, although it may occur in New England. The specimen so reported from Connecticut by C. B. Graves, RHODORA, 3: 63. is a robust form of *Panicum columbianum*.

PANICUM TSUGETORUM Nash, has been reported from various places in New England, but there are no specimens in any of the collections examined. It probably occurs in southern New England.[1]

PANICUM STIPITATUM Nash. (*Panicum elongatum* Pursh, not Salisb.) A species very closely related to *Panicum agrostoides* is to be expected from southern New England, as it occurs about New York City.

PANICUM SCOPARIUM Lam. The New England form which has been referred to this species is *Panicum scribnerianum* Nash. True *Panicum scoparium* Lam. is the form described by Elliott as *Panicum viscidum*, a southern species, while *Panicum scoparium* of Elliott, a very distinct form, is now known as *Panicum ravenelii* Scribn. & Merrill. For discussion of this species see Scribn. & Merrill, U. S. Dept. Agr., Div. Agros. Bul. **24**: 34. 1901.

PANICUM PUBESCENS Lam. From examination of typical material in the Herb. Mus. Paris, was found to be the late branched

[1] Since the above article has been in press we have received specimens of *Panicum tsugetorum* Nash, from Dr. C. B. Graves, No. 170, collected on Mason's Island, near Mystic, Connecticut, July 15, 1897. It is a tufted somewhat pubescent perennial 2 to 4.5 dm. high with slender at length much branched culms, thin leaves and small pubescent spikelets. Culms and sheaths pubescent with short appressed hairs, intermixed toward the base with longer ones. Leaf blades erect or ascending, lanceolate, minutely appressed-pubescent beneath, glabrous above, 4 to 8 cm. long, 5 to 8 mm. wide, those of the branches smaller. Primary panicle ovate, 4 to 6.5 cm. long, its branches few-flowered, spreading, ascending, spikelets ovate, 1.8 mm. long, the three empty glumes pubescent.

This species is very closely related to certain forms of *Panicum lanuginosum* and in many cases can only be distinguished by the appressed-pubescent lower surface of the leaves.

stage of *Pani um scoparium* Lam. (*Panicum viscidum* Ell.) See Scribner & Merrill l. c. 36.

Panicum laxiflorum Lam. of Gray's Manual, ed. 6, 633 and (?) Trin. is *Panicum boreale* Nash. *Panicum laxiflorum* Lam. is a southern species.

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SOME MAINE PLANTS AND THEIR USES, "WISE AND OTHERWISE."

Jennie M. H. Morrell.

The following partial list of Maine plants and their uses is based upon my own observations and recollections as well as upon notes furnished me by others who have known the plants to be used.

Pteris aquilina. When this first starts growth in the spring it is cooked and eaten in place of asparagus, and I am told that one cannot tell the difference by tasting.

Osmunda cinnamomea. The heart of the root is eaten by children for its nutty taste. It is said to have some medicinal value, and is known sometimes as "bog onion."

Taxus Canadensis. The red berries of this, the ground hemlock, were one of the favorite fruits of my school days.

Typha latifolia. The leaves are gathered, dried and marketed: they are used by coopers in making molasses hogshead, the leaves being placed between the staves to make them tight. In early times the heads or cat-tails were used in place of feathers for making beds.

Arisaema triphyllum. The corms, dried and boiled, are said to have been extensively used as food by the Indians.

Acorus Calamus. Many people enjoy eating or nibbling the root of the sweet flag; and I remember seeing cough syrups made by boiling molasses and sweet flag. The root is candied by the Shakers and sold at Poland Springs.

Lilium Canadense. The Indians used the bulbs in making soups and in thickening their broths which were thus made more palatable.

Medeola Virginiana. The roots when used like cucumbers taste very like them and are certainly clean enough for food.

Cypripedium acaule. A decoction of the root of this or any of the other Cypripediums, known as "nerve-root" or "squaw-root," is taken internally to cure neuralgia and nervous diseases.

Myrica cerifera. The leaves, under the name of bayberry, are used to stuff pillows. In early times candles were made from the wax contained in the leaves, fruit, and twigs; and in burning they gave off a pleasant fragrance. The wax is now used by the Shakers in the preparation of a fine salve.

Myrica asplenifolia. The branches and leaves are steeped and the decoction is used to kill the poison of *Rhus Toxicodendron.*

Betula populifolia. Some people made their vinegar from the sap of the white or gray birch.

Rumex Acetosella. Red sorrel has been used in Aroostook County to make pies.

Chenopodium album. The pigweed, used to color the curd in making sage cheese, has been thought also to make the cheese rich. Under the name of lamb's quarters it is commonly used for greens.

Caltha palustris. Under the name, cowslip, the plant is much sought for greens, and it is sometimes cultivated.

Coptis trifolia. The roots of gold-thread are used for canker in the mouth.

Actaea spicata, var. *rubra.* Under the name of "cohosh" this is used as a remedy for heart troubles.

Hepatica triloba. Used for consumption, and under the name of liverwort for liver troubles.

Geum rivale. The plant is called chocolate-root, and the root when boiled makes a drink like chocolate.

Prunus Pennsylvanica. Fire cherries in combination with currants make a fine jelly. Used alone they make a jelly which is considered very healthful and healing if one has throat or lung troubles.

Prunus Virginiana. Choke cherries are sought to be eaten fresh. Cooked they make nice pies and sauce.

Prunus serotina. Black cherries are better eaten fresh than either of the previous. They are used in making cherry wine and also for a jelly which is considered to have considerable medicinal value.

Impatiens fulva. The juice of bruised leaves of this, "Celandine," is said to be a sure cure for the poison of *Rhus Toxicodendron.*

Daucus Carota. Carrots raised from seeds of the wild plant are said to be sweeter than the common garden varieties, but I think most people look upon them as poisonous.

Carum Carui. Caraway seed is used in cakes and in candy.

Ledum Groenlandicum (*L. latifolium*). The Labrador tea is used for canker in the stomach, and sometimes for dysentery.

Asclepias Cornuti. The young shoots are sometimes used for greens. The ripened pods are opened and used for decorative purposes. The silky down of the seeds is used for fancy bags and pillows, and it is said to have been spun for candle-wick by early settlers

Scutellaria lateriflora. Skullcap steeped and drank induces sleep.

Nepeta Cataria. One of my neighbors came in a hurry one day to get some of my dried catnip. She said her husband was threatened with pneumonia, and that catnip used in poultices and taken internally as a tea was a sure cure. I had long known of people using catnip tea for headaches and stomach troubles.

Physalis heterophylla. The fruits make nice preserves. In an old cook-book they are called husk-tomatoes.

Datura Stramonium. The capsules are smoked for asthma, and the root is sometimes used medicinally by country people.

Sambucus Canadensis. The flowers are used by my neighbors for elderberry wine, as are the berries also when they come later. Some people make a delicious jelly from the berries.

Viburnum Opulus. The fruit, known as "highbush cranberry" is used for sauce and jellies.

Cucurbita Pepo. Pumpkin seeds have been used to make custard pies, eight seeds shelled and pounded being used in place of one egg. Apple seeds are sometimes used in the same way, many more seeds, of course, being needed.

Eupatorium perfoliatum. Under the name, thoroughwort, this is used as a tea for colds, in syrups with molasses for coughs, and is supposed to be a good blood medicine. It is also much used in diseases of cattle.

Eupatorium purpureum. Joe-Pye-weed is used in Bright's disease.

Solidago. The blooms of various kinds are used to dye yellow.

Aster macrophyllus. The leaves were used in Gardiner fifty years ago as greens. They were called "tongue."

Tanacetum vulgare. Tansy cheese used to be made by steeping the tansy and pouring the tea into the milk before the curds were made.

Arctium Lappa. Burdock leaves are much used in the country as draughts to relieve fevers and headaches. The root is used in medicine.

Leontodon autumnale. Under the name of Arnica this is used in alcohol to relieve bruises, lameness, and rheumatism. A Farmingdale man declares it the best remedy known. The buds of Balm of Gilead, *Populus balsamifera*, are used in a similar way.

Taraxacum officinale. The dandelion is much used for greens. The root is said to give a very nice rich flavor to coffee, and it is sometimes used as a medicine. The roots of dandelion and of *Aralia nudicaulis*, the leaves of *Chimaphila umbellata* and *Gaultheria procumbens*, and the young shoots of hemlock and spruce are used in making root beer.

A strange dish of greens was once prepared, under the direction of an old woman of Irish descent, in my father's house. These were dandelions; two or more species of *Rumex*, one of which was *R. Acetosella*; the young shoots and leaves of the red raspberry; the young fronds of *Pteris aquilina*, under the name of hog-brake; and a generous portion of Canada thistle, *Cnicus arvensis*.

Gardiner, Maine.

NOTES ON ALGAE, — III.

F. S. Collins.

The species here mentioned either are new to the American Flora, or their range is extended by the localities given. Unless otherwise indicated, they were collected by the writer.

Protoderma marinum Reinke, Algenflora der westliche Ostsee, p. 81, was found by the writer at Bridgeport, Connecticut, on New Year's day, 1900, on the shore by Seaside Park, where it formed a very thin, transparent, pale green coating on small pebbles in pools. The coating consists of a single layer of small polygonal cells, with rather thick walls; when examined with the microscope, many of the cells were found to be producing zoospores. In May a little of the same species was found at Newcastle, N. H., but not fruiting. In November it was quite abundant at Revere Beach, Mass., and

produced zoospores plentifully. Probably it occurs all along the coast, but it is so inconspicuous that unless one is looking for it, it will hardly be found.

Plectonema Nostocorum Bornet was found in the gelatine of a small Nostoc, growing in a watering trough by the side of the road from Seal Harbor to Jordan Pond, Mount Desert, Maine, July 16, 1900. It is a very minute plant, the filaments being only 1 to 1.5 μ diameter, is common in Europe in connection with various gelatinous algae, and will probably be found equally abundant in this country. It is described and figured in Gomont, Monographie des Oscillariées, p. 122, pl. I, fig. 11.

Ectocarpus fasciculatus var. *abbreviatus* (Kuetz.) Sauv. seems to be common on Laminariaceae from Boston north. It usually covers the older part of the lamina of the host with a dense coating, the fronds seldom over a centimeter high. The fructification is like the type, except that the sporangia are often clustered, and are often found, apparently proliferous, on the main stem, sometimes at the very base; the branching is quite irregular.

Elachista Chondri Aresch., Obs. Phyc., part 3, p. 17, pl. II, fig. 2, occurred at Ochre Point, Newport, R. I., May 26, 1900, growing on *Chondrus crispus* (L.) Stack. near low water mark, at a point exposed to the surf. In general appearance it is not unlike *E. fucicola* (Velley) Fries, common everywhere on *Ascophyllum nodosum*, and occasionally on other plants. Most of the species of Elachista seem to be limited to one or a few host plants each, and this species was found by its author growing on *Chondrus crispus* and *Furcellaria fastigiata* (Huds.) Lamour., on the coast of Sweden. The latter host has not been found in America, but the Chondrus is very common along the whole New England coast. Possibly it may be found that *E. Chondri* is not rare, but certainly it is not common; the writer has for two or three years given some attention to Chondrus, in regard to the different organs of fructification, and would hardly have overlooked a plant like *E. Chondri*.

Actinococcus aggregatus Schmitz, Flora, p. 385, 1893, occurs on *Gymnogongrus Griffithsiae* (Turn.) Mart., growing at low water mark on the beach at Portsmouth, Rhode Island, near Wood Island Park; it was fairly abundant in June, 1900. The genus Actinococcus is made up of several species, each formerly supposed to be the tetrasporic fruit of some alga, which is now considered merely the host

plant. The vegetative portion of the parasite is much reduced, consisting merely of filaments penetrating the host, and winding about among the cells of the frond. The fructification is external, and consists of a cushion of densely packed, radiating filaments, the cells of which at maturity are changed into tetraspores. Several genera of this character have been described by Schmitz; we have three species in New England, *Sterrocolax decipiens* Schmitz on *Ahnfeltia plicata* (Turn.) Fries; *Actinococcus subcutaneus* (Lyng.) Schmitz on *Phyllophora Brodiaei* (Turn.) J. Ag., and *A. aggregatus* on *Gymnogongrus Griffithsiae*. It is a curious fact that in each case the parasite has tetrasporic fruit of the character appropriate to the host, while the host appears to have lost the capacity for producing tetraspores, and is propagated either by cystocarps, or only vegetatively.

Melobesia Corallinae Crouan was found on a frond of *Corallina officinalis* L., by Mr. L. L. Dame at Siasconset, Nantucket, and reported in Mrs. Owen's Plants of Nantucket, in 1888. There is no other report of its occurrence, but this year it was found in considerable quantity at Newport, Rhode Island, and at Nahant, Massachusetts, and more sparingly at Seal Harbor, Mount Desert, Maine. Probably it may be found wherever *Corallina officinalis* is common.

In Rhodora, Vol. II, p. 11, the writer noted the occurrence of a single specimen of *Ralfsia Borneti* Kuckuck at Seal Harbor, Maine. Since then this species has proved to be common on rocky shores along the whole New England coast, growing on pebbles, Lithothamnion, and especially on the shells of live mussels.

Miss E. M. Cherrington of Hyde Park, Mass., has been so kind as to allow the writer to examine a collection of algae made by her on the Maine coast last summer, and among them are three species not hitherto reported from that region. One of them, *Monostroma latissimum* (Kuetz.) Wittr., was to be expected, though it is certainly not very common, as the writer has looked for it every summer for the past twelve years unsuccessfully. Miss Cherrington's specimens were collected at Bayville, in July. The other two are of considerable interest, being species hardly to be expected there. At Port Popham, at the mouth of the Kennebec, Miss Cherrington found several specimens of *Callithamnion tetragonum* (With.) Ag., not depauperate specimens, but well developed individuals, over 12 cm. high. This species has never before been reported north of

Cape Cod, though the nearly allied *C. Baileyi* Harv. occurs, in the slender, delicate var. *boreale*, in Massachusetts Bay, and is reported by Farlow, N. E. Marine Algae, p. 127, as found by C. B. Fuller at Portland. But the plants now in question do not approach ordinary *C. Baileyi*, much less the var. *boreale*; they are quite like typical *C. tetragonum*, as found at Newport, Rhode Island.

The third species, *Lomentaria rosea* (Harv.) Thuret has hitherto been found only from Vineyard Sound to Newport, growing in deep water in company with *Scinaia furcellata* (Turn.) Bivona, which has practically the same range. The only exception to this is in Harvey, Nereis Bor. Am., part 2, p. 186. In the list of habitats, is given β, Portsmouth, N. H., Dr. Durkee. There is no description of var. β, but this note; "Dr. Durkee's specimen, noticed above, is irregularly branched, the primary stems filiform and straggling, the secondary either pinnated or furnished at one side only with pinnules. I have seen British specimens similar to this in ramification." This reference has been generally regarded somewhat as Pike's report of *Bostrychia rivularis* Harv. at the Isles of Shoals, but Miss Cherrington's finding the plant at East Boothbay, July 22, makes it quite credible. The specimens are small, hardly 2 cm. high, but agree better with the plates in the Phycologia Britannica than with the description of the Portsmouth plant.

This species was described and figured by Harvey in the Phycologia Britannica, Pl. CCCI, as *Chrysymenia rosea* var. *Orcadensis*, with a reference to *C. Orcadensis* of Harvey's Manual, ed. 2, p. 100. In Pl. CCCLVIII A, of the Phycologia, a figure is given of *Chrysymenia rosea* from the Yorkshire coast, but the distinction of type and variety seems not to have been followed by subsequent authors. There appears to be no record of it in Europe except on the coasts of England and Scotland; its presence among the warm water algae of the English Channel, and also at the Orkneys and on the East Coast of Scotland, where *Euthora cristata* (L.) J. Ag. occurs, is paralleled by its occurrence in the warm waters of southern New England, and on the Maine Coast.

It is of interest to note that though Harvey figures British specimens, he speaks of the name of *Chrysymenia rosea* having been first given, in his herbarium, to specimens received from Newport, Rhode Island.

The occurrence in a comparatively small collection of these three species new to Maine, and two of them extending the known

range of the species in an interesting way, shows what possibilities still remain for any intelligent botanist, even with little previous knowledge of algae. Very likely there are many collections similar to Miss Cherrington's which when examined might yield results of equal interest.

During the past summer two species have been found on our coast, which appear to be new, and which are characterized as follows.

Isactis **centrifuga** Bornet ms. Frond dark green or nearly black, up to 4 cm. diameter, growth marginal, the central portion of the frond becoming detached from the substratum and rounding upwards, while the margin remains closely attached. Filaments 8–12 μ diam., slightly swollen at base, reaching a length of a millimeter; sheath firm, usually translucent, sometimes brownish and opaque; trichomes 8–10 μ diam., cells one third to one half as long as wide; heterocysts basal, spherical or depressed; rarely intercalary, spherical or elongate. On rocks near low water mark, Ochre Point, Newport, R. I., May 26, 1900. — Dr. E. Bornet in litt.

This plant was at first supposed by the writer to be *Rivularia Polyotis* (J. Ag.) Born. & Flah., which might be expected on our coast; but on submission of specimens to Dr. Bornet, the latter pointed out the distinctly marginal growth of the frond, which would refer it to the genus Isactis. This genus has hitherto been monotypic, *I. plana* (Harv.) Thuret, growing on algae, shells and stones, being found in the Mediterranean and in the warmer waters of both sides of the North Atlantic. From this well known plant *I. centrifuga* differs by the thicker frond, larger filaments and trichomes, and especially by its character of loosening itself from the substratum at the centre, while the margin continues firmly attached and growing; sometimes the older parts are broken away leaving only a ring.

Pleurocapsa **crepidinum**, n. sp. Cells spherical or by mutual pressure polygonal, up to 15 μ diameter; cell wall rather thin, translucent, contents dull blue or slate color. Cells dividing vegetatively, often remaining attached in dense masses; sporangia spherical, filled with small spores.

This considerably resembles *P. amethystea* Rosenvinge, Grønlands Havalger, p. 968, fig. 57, and it was at first supposed to be that species; but Dr. Rosenvinge, to whom a specimen was sent, pronounces it distinct. *P. amethystea* has a lilac or violet color, and less regular sporangia, the formation of the spores seeming to be rather the

result of a coccoid stage than produced by true sporangia. The appearance of *P. crepidinum* is much that of a Dermocarpa, but the true vegetative cell divisions place it in Pleurocapsa.

It occurred sparingly in a coating composed of several minute algae, on the woodwork of an old wharf, at Otter Creek, Mount Desert, Maine, July 17, 1900.

Protoderma marinum was included in the Preliminary List published in RHODORA, Vol. II, p.45; *Ectocarpus fasciculatus* var. *abbreviatus*, *Isactis centrifuga*, *Elachista Chondri*, and *Actinococcus aggregatus* were issued in the Phycotheca Boreali-Americana, Nos. 731, 757, 773 and 786, respectively; *Melobesia Corallinae* will appear in a later fascicle.

NOTES ON HYBRIDS OF QUERCUS ILICIFOLIA.

ALFRED REHDER.

WHILE botanizing last year about the middle of September in the Blue Hill Reservation and following the path which leads from Blue Hill Avenue to the top of the hill, I directed my attention to the varying shapes of the foliage of the Oaks. *Quercus rubra*, *coccinea*, *velutina*, *alba*, *ilicifolia* and *prinoides* are common there, with the exception of the last named species, and form, in fact, the chief components of the second growth which clothes the hill. The top is almost exclusively covered by the low growth of *Quercus ilicifolia*, hardly exceeding 5 ft. in height. As I reached this region and was passing the last higher bushes of *Quercus coccinea* and some other trees, my attention was attracted by a small tree bearing foliage similar in shape to that of *Quercus ilicifolia* but differing in habit and greater height from this species. The leaves, too, although they had almost the outline of those of *Quercus ilicifolia* showed a marked difference in the tomentum of the lower surface, which was only slightly tomentose or almost glabrous in most of the leaves. These characters led me at once to the conclusion that I had stumbled on a hybrid of *Quercus ilicifolia* with a species of the *Q. rubra* group and I naturally suspected first *Q. coccinea*, which grew plentifully around it, to be the other parent. A closer examination,

however, did not verify this opinion since the cup scales and the winter buds were more tomentose than in either of the suspected parents and make more probable the parentage of *Q. velutina*, though the smallness of the foliage and winter buds points more toward *Q. coccinea*. The shape of the few-lobed leaves seems to exclude *Quercus rubra*, as also the smallness of the acorns which are almost indistinguishable from those of *Q. ilicifolia* save for the somewhat deeper cups and the more tomentose scales. It is therefore not without hesitation that I pronounce the Oak in question a hybrid of *Q. ilicifolia* and *velutina* but it seems to me the most probable explanation of this peculiar form.

I noticed only two small trees of this hybrid standing close together on the left side of the path not far from the top and a little below the last larger *Pinus rigida*. The trees, of which the larger is about 15 ft. high with a girth of 7 inches at the height of 5 ft. where the first branches appear and the smaller about 12 ft. high, seem to spring from a common root and are probably second growth from a decayed stump. The main branches diverge at a more acute angle and are less crooked than in *Q. ilicifolia*.

QUERCUS ILICIFOLIA Wangenh. (*Q. nana* Sarg.) × VELUTINA Lam. Small tree with spreading branches; branchlets dull yellowish or reddish brown, tomentulose when young: winter buds globose-ovate, obtuse, 1–1½ lines long, covered with dense yellowish gray tomentum: leaves 1½–4 inches long, rounded or cuneate at the base, pinnately lobed with 2–3 pairs of spreading lobes and with the sinuses reaching almost half way to the middle, lower lobes broadly triangular-ovate, entire, middle lobes triangular ovate or sometimes oblong-ovate with 1–3 small bristle-like teeth, upper lobes short and entire, small close to the apex and separated from the middle lobes by wide and very shallow sinuses, upper surface dull dark green, lower one paler and covered at maturity with a thin floccose grayish tomentum which often almost disappears at length except in the axils of the veins and along the midrib: acorns short-stalked; cup top-shaped contracted at the base into a short thick scaly stalk; the scales densely covered with a fine yellowish gray tomentum; nut globose-ovoid, about 6 lines long, slightly striate, tomentulose.

Specimens are preserved in the herbarium of the Arnold Arboretum, in the Gray Herbarium and in my own private herbarium.

The accompanying plate kindly prepared by Mr. C. E. Faxon will serve to give a clearer idea of the exact shape of the foliage than a description possibly can. Leaves of the two other hybrid forms of *Q. ilicifolia* mentioned below are shown on the same plate for comparison.

An Oak supposed to be of the same parentage as the above described hybrid has been reported from Ocean Grove, N. J., by J. K. Haywood (see Sargent, Silva N. Am. 8, p. 156).

Specimens of this form are preserved in the herbarium of the Arnold Arboretum, but as no fruits have been collected, it seems inadvisable to venture any definite opinion about it. The leaves differ from the hybrid described above chiefly by their larger size; they are 4–7 in. long, besides they are less deeply lobed with broader and shorter entire lobes, the winter buds are larger and more pointed and the young branches more glabrous.

Another interesting hybrid of *Quercus ilicifolia* was found about 45 years ago in Northbridge, Mass., by Dr. J. W. Robbins of Uxbridge, Mass. It is mentioned by A. Gray in Man. Bot. Ed. 5, p. 454 (1867) as a hybrid of *Q. ilicifolia* and *coccinea*. By Dr. Robbins it was designated as *Q. palustris* × *ilicifolia*, but this is not probable since *Q. palustris* does not grow in this region. He gives in a note accompanying his specimens, which are preserved in the Gray Herbarium, the following account of the tree itself and the locality where he found it. Perhaps it may help to ascertain whether the tree is still existing.

"*Q. palustris* × *ilicifolia* Robbins. Flowers gathered on the 20th of May, 1866, from a tree 40° high and 19′ in circ. 7° from the base; hybrid in all probability from the species indicated; the former of which a tree 2° in diam. stands at a distance of but 4 rods and the other a shrub beneath it and elsewhere in the vicinity. The tree overhangs the old road to Uxbridge about the middle of a small wood, half a mile southwest of Whitinsville in Northbridge, Mass. The frost color of the leaves is intermediate between the red of one and the dull brown of the other. The ripe acorns are mostly striate. I first noticed the tree as peculiar about 1855."

Quercus coccinea × ilicifolia (A Gray Man. Bot. ed. 5, p. 454 (1867). — Engelmann, Trans. St. Louis Acad. 3: 542 (1876). — Sargent, Silva N. Am. 8: 156 (1895) is very similar to the hybrid from Blue Hill. The young branches remain tomentulose until autumn: winter buds ovate, about 2 lines long; scales ciliate and yellowish appressed-pubescent chiefly in the middle: leaves $3\frac{1}{2}$–$5\frac{1}{2}$ in. long, in shape almost like those of the hybrid from Blue Hill, but the middle lobes narrower and longer, the sinuses deeper and the texture somewhat thinner, usually rounded at the base; petioles about 1 in. long: acorns very short-stalked; cup almost hemis-

pherical contrasted at the base into a short scaly stalk; scales appressed-pubescent, but glabrous at the margin and apex; nut oval, 6–7 lines long, striate, glabrous.

ARNOLD ARBORETUM.

EXPLANATION OF PLATE 24. — *Quercus ilicifolia* × *velutina* from Blue Hill: fig. 1, fruiting branch; *Q. ilicifolia* × *velutina* from Ocean Grove: fig. 2, leaf; *Q. coccinea* × *ilicifolia*: fig. 3, acorn; fig. 4, leaf. All figs. one half natural size.

TWO MUSHROOM BOOKS.

To amateurs of mushrooms, who have found the literature of the subject at times hopeless and dreary, a little volume[1] recently published in Philadelphia should bring recreation and entertainment. Inspired to see, with Emerson, that "a poor fungus or mushroom .... is the symbol of the power of kindness," the authors of the modest volume were led by the difficulties that beset the path to knowledge to think of the trials and distress of others that might follow in their footsteps. How could they help them? "This little book is the answer." "Let us give our own experience," they said, and they have told it in language as simple as it is diverting.

To review the book seriously would be cruel. It is not meant to be reviewed, but to be read and enjoyed, in the spirit in which the authors carried on their studies. By quotation, however, the true value of the book to the weary student can, perhaps, be indicated. "We began for pleasure and recreation, but it became irksome and fatiguing, and the subject which might have amused us .... is put aside and abandoned."

The introduction transports us from "the bustling, noisy streets of a city into the quiet fields and woods, where the bright-hued mushrooms" invite us to "the discovery of new specimens, the learning of their names, the knowledge of their curious organizations" which "will all add an interest to our lives." "Among the fallen leaves — peers out a bright yellow mushroom." We dig it up. "We have brought a basket and trowel and can examine them thoroughly."

[1] Among the Mushrooms. A Guide for Beginners. Emma L. Dallas and Caroline A. Burgin, Philadelphia, 1900; Drexel Biddle, Publisher. pp. 175, $2.00.

From the woods we pass presently to the study, to learn that "Fungi have existed from early geological ages," the oldest known Hymenomycete, being the one that "was called Polyporites Bowmanii." "It is interesting to know that even before the Tertiary period the undergrowth consisted of ferns and fleshy fungi. What a time of delight for the botanist! But there were no human beings in those days to roam amongst that luxuriant undergrowth, and only the fossil remains in the deposits of coal and peat are left to tell of their former existence." Alas! Untimely fate of early man!

Under various heads follows much information as to structure, habit, etc., that can be gathered rather better from other books. No where else, however, can we learn that the "group of Basidiomycetes is divided into (1) Stomach fungi, (2) Spore sac fungi, and (3) Membrane fungi"; or that in Agarics the gills "contain the spores"; or that the trama "lies between the two layers of gills in Agarics."

In an outline of the system of classification, the principal genera are briefly characterized, and the meanings of their names are elucidated. The student may here learn much that no lexicon will ever reveal to him: that Lactarius = milk; Marasmius = to wither; Cortinarius = a veil; and Telamonia = lint. Having worked through the genera in this way, the authors proceed to give descriptions "of fungi familiar to most persons, classified according to the colors of the cap." The list begins with *Russula emetica*,[1] described, as is not unusual, in such a way as to make it very doubtful whether the writers know the species. Thus, no mention is made of its viscidity, and it is said to grow "among dead leaves, in the woods and open places from July to December." *Cortinarius alboviolaceous*, the last species in the list, exemplifies a prevalent uncertainty in the handling of the Latin names. Then follows "a list of fungi that we constantly see, but which cannot be classified by the color of the cap." Here we find much curious information, as in regard to *Clavaria flava*: "Stevenson does not mention this species, so it may be peculiar to this country." Of the Jew's Ear we learn a new habitat: "It is a very peculiar-looking fungus, shaped somewhat like the human ear, of all sizes, and grows in great quantities in the same place."

But it is impossible, even by continuing to quote, to give the charm

[1] See note by Dr. Burt in RODORA 2: 71; March, 1900.

of this modest and kindly attempt to smooth the way to knowledge. Only the possession and leisurely perusal of the little volume will reveal its unique character.

Quite different must be the attitude of a reviewer to the latest book placed before the public.[1] Written by a person with botanical training, "The Mushroom Book," lays claim, or should, to scientific accuracy and method. It is, to be sure, avowedly a popular book. The publishers would have wished to undertake no other kind. But even popular books can and should be scientific, in the true meaning of the word, that is to say, they should present facts accurately and systematically.

The book makes an admirable first impression, due to the amplitude of the pages and spacing, the broad margins, clear printing sharply outlined cuts, and excellent plates. The publishers indeed, have done their work well. Examination of the book unfortunately, effaces this good impression. The introductory matter, it is true, is on the whole well arranged and expressed, especially the chapter headed "From Spore to Mushroom." The Key which follows, too, is made intelligible to the novice by abundant diagrams illustrating the terms employed. It is with the bulk of the book, the hundred pages descriptive of genera and species, that fault must be found. Here there is absolute confusion. Groups, and genera under groups, are taken up, as it seems, haphazard. In the white-spored series of Agarics, for instance, the first five genera in order are Amanita, Cantharellus, Amanitopsis, Mycena and Lentinus, and the last five are Schizophyllum, Omphalia, Russula, Clitocybe and Tricholoma. Whatever may have determined this succession, it was not the probable convenience of the student, for no knowledge of any principle of classification will guide him when he wishes to refer to the description of a species and, if he has no such knowledge, he is not likely to be assisted as his familiarity with the order of the plates increases.

As to the character of the descriptions, it is very evident, even without the acknowledgment in the preface, that they do not imply any acquaintance on the part of the author with the plants themselves. And this criticism applies with special force to such species

[1] The Mushroom Book, by Mina L. Marshall, New York, Doubleday, Page & Co., 1901, pp. 167. $3.00.

as *Russula emetica*, which demand the most accurate treatment. Nothing is said by Miss Marshall, any more than by the authors of "Among the Mushrooms," of the viscidity characteristic of this plant. In fact no mention of this character is made under the genus, and yet it is of the utmost importance in distinguishing between species. The author's final remark that *Russula emetica* "may readily be distinguished by its peppery taste," betrays ignorance of the existence of other red species that are also acrid. She seems, indeed, to share the too common conviction, that any acrid red Russula is *R. emetica*. Her treatment of the yellow Amanitas is dangerous. The final recommendation in regard to them — that those with a cup are edible — is most unwise, for its application may not be restricted by careless people — those most exposed to danger.

Another instance of inaccuracy is in the statement, in regard to the genus Hygrophorus, that the gills are decurrent. Although this is true of many conspicuous species, so that an incorrect impression is easily gained by an unobservant person, it is by no means universally or even generally the case. Examination of some common species, *H. miniatus*, *H. puniceus*, *H. conicus* and *H. chlorophanus*, for instance, will show an entirely different state of things. A few pages further on we are told under *Lepiota procera*, that "there is no poisonous species for which it can be mistaken, if one bears in mind" its structual characteristics. Has the author never heard of *Lepiota Morgani*, a dangerous species, which a tyro would easily mistake for *L. procera*? Another source of dissatisfaction with the descriptions is their extreme scantiness in some cases. The characterization of some genera is so slight as to amount to nothing at all; examples are Pholiota, Panaeolus ("black, ovoid spores, cap smooth and not striate, a fleshy stem"), Physalacria, ("small, simple, hollow, and enlarged at the apex"), Lachnocladium ("leathery plants covered with hairs") and Trametes.

The discovery of other inaccuracies and omissions of this kind must be left to the readers. One conspicuous tendency to misinform the uninstructed must however be mentioned. We all know the popular difficulty caused by Latin names. Recognizing this, the author, as her preface states, makes a point of marking the length of vowels and the place of accents. If her desire has been to record prevalent errors in the pronunciation of Latin, she has been remarkably successful. But she should have been surer of her ground

before setting models that, if they have any effect, will tend to confirm some illiterate usages and establish others quite new. Whatever may be said of generic names, which often, as in the case of the American pronunciation of *Coprínus*, permanently escape from the control of the laws of quantity, there will never be but one correct way to spell and to accent specific names when they are formed by Latin adjectives. In spite of Miss Marshall, then, and those whose usage she records, it is incorrect to say *rádicans*, *calópus*, *édulis*, *velútinus*, *prócera*, *caesaréa*, and *albídum*, just as truly it is incorrect to write *velutipas* or *cretaceous*. This sort of thing becomes ludicrous when for *Fávolus alveolaris* (the original spelling) is recommended *Favólus areolarius*.

The best thing about the book is the series of plates, around which the text is built. They are from the work of Mr. J. A. and Miss H. C. Anderson, whose colored photographs have been much admired. Only a few of these (*Armillaria mellea*, *Clavaria formosa*, *Boletinus pictus*, *Calostoma cinnabarinum*, for instance) fail to do justice to the plants. The rest are admirable. It is a noteworthy performance to have the three species of Calostoma, so long disputed, clearly differentiated on one plate. Yet the plates have been badly handled. They are not numbered, and some species are far removed from the places where they occur in the text.

It would be pleasant to find less to say in condemnation of a work like "The Mushroom Book." Its publishers are pushing it hard as the best book on the market. It is said to be selling well, and there is reason to fear that it is.

Two Additions to the Flora of Connecticut.— Last summer the writer found, in Hartford, the following plants which do not appear to have been previously reported as occurring in Connecticut:

Scleria pauciflora Muhl. A patch about a rod square on Kenney Park, Hartford, in dry sandy land sloping to the south.

Panicum sphaerocarpon Ell. In several places in Hartford, always in dry land. Appears to be quite common.— Hans J. Koehler, Hartford, Connecticut.

Botrychium matricariaefolium on Mt. Toby, Massachusetts. —In Mrs. Owen's interesting account of the ferns of Mt. Toby in the March number of Rhodora, it is stated that *Botrychium matri-*

cariæfolium has not been found there. I take pleasure in adding this species to her very complete list, having collected it at the summit of Mt. Toby, May 31, 1897, and May 30, 1898. The plants were growing luxuriantly for this small species, although most of them were not quite mature at that early date. I would add that I submitted the specimens to Mr. George E. Davenport, who fully confirmed my determination of the species.— T. O. Fuller, Needham, Mass.

A Correction regarding Barbarea praecox.— In my article in the March Rhodora, through an oversight, *Barbarea praecox* R. Br. was reported as new to New England. In fact it has been known near New Haven and Bridgeport for some years, as recorded in the Berzelius Catalogue and Bishop's List. The Waterford Station, however, extends its known range somewhat to the east. — C. B. Graves, New London, Connecticut.

Noteworthy Panicums in Connecticut.— The following notes regarding the occurrence, frequency and habitat of several Connecticut Panicums may help to determine their status in our flora.

Panicum barbulatum, Michx.— Is becoming better known in the State. It has been previously reported in Rhodora from southeastern Connecticut. Mr. C. A. Weatherby has collected it at So. Windsor. The species is frequent about Hartford and vicinity.

Panicum sphaerocarpon, Ell.— Is also frequent throughout the vicinity of Hartford ; collections from Kenney Park by Hans J. Koehler and myself agree clearly with recent descriptions of the species. Mr. Weatherby has collected it at Manchester in typical form.

Panicum macrocarpon, Le Conte, and *Panicum agrostidiforme* Lam., are recognized additions to our flora.

Panicum xanthophysum, A. Gray.— Was collected in So. Windsor on July 12, 1900. (*Koehler, Withers & Driggs*). No other stations have been reported in the State. The plants were growing along a wood-road in almost pure sand. The woods had been recently cut off leaving a growth of scrub oakes, chestnuts, birches and other shrubs adapted to sandy soil in place.

This plant should be found elsewhere on the sandy plains and woodlands of the Connecticut Valley. There was nothing in the

soil or surroundings that would indicate any difference from many similar places that are found in the State.

It has been previously reported in Rhodora, as far south in New England as Southbridge, Massachusetts.— A. W. Driggs, East Hartford, Connecticut.

Juniperus communis, var. erecta, in Massachusetts. — In recent endeavors to make a complete list of the conifers growing without cultivation in the vicinity of Northampton, Massachusetts, I was fortunate enough to find a small colony of the tall Juniper described by Mr. Alfred Rehder in the Cyclopedia of American Horticulture, as *Juniperus communis*, var. *erecta*, Pursh. As this form is very rare in New England, it seems worthy of mention in Rhodora. It was growing in the same field with the common prostrate form, *J. communis*, var. *canadensis* Loud., but differing essentially in the manner of growth, the small trees being perfectly erect, some of them columnar, others spreading. The tallest one I saw was somewhat over ten feet in height, with a trunk-girth of ten inches. The leaves are longer than those of the low form, and not so thickly crowded upon the branches. In the fruit I could discover no difference. The distinguishing characteristics, then, were the longer and less crowded leaves, the much greater size, and the erect growth. — Emily Hitchcock Terry, Smith College, Northampton, Massachusetts.

[The common low juniper of barren pastures and hillsides in New England is treated by Mr. Rehder as *Juniperus communis*, var. *canadensis*. The tall form noted by Mrs. Terry is common further south, but, so far as we are aware, it is not otherwise known in New England. *J. communis*, var. *nana*, Loud. (var. *alpina*, Gaud.), to which the var. *canadensis* has often been erroneously referred, is thus far known in our limits only from the North Basin of Mt. Katahdin. — Ed.]

Vol. 3, No. 28, including pages 67 to 92, was issued 1 April, 1901.

C. E. Faxon, del.

Figs. 1 and 2, QUERCUS ILICIFOLIA × VELUTINA.

Figs. 3 and 4, Q. COCCINEA × ILICIFOLIA.

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Almost immediately upon leaving Oldtown, the home of the Penobscot Indians, one feels that he is in the woods, and every minute of the ride will make him impatient to stop the train for the tantalizing plants which flash by in the clearings or by the streams. In fact, the true botanist will inevitably moralize to himself on the desirability of through vestibuled trains and parlor cars, and he may decide to take the freight train at the next station.

If he has spent hours about home searching for something really new to him, he will start with delight as he sees the fields and banks of blue *Aster Lindleyanus* just above Oldtown, or the clearings crimson in September with the drooping tassels of *Polygonum Careyi*. Or, if he is fortunate enough to get off in May, he will be greeted from recent clearings by fragrant white masses of Sweet Coltsfoot, *Petasites*.

Just beyond Alton, he cannot help longing to explore the indefinite miles of Sphagnum swamp, and if he looks to the West, he will see a beautiful little round pond bordered by gnarled Black Spruces, which he instantly knows must be covered with the tiny Mistletoe, *Arceuthobium pusillum*. Alton bog is well worth exploring, but it is only a small area compared with the hundreds of miles of such country through North-central Maine, and unless one has plenty of time he should save that and his enthusiasm for "farthest north."

If one is bound for Moosehead Lake he will follow the Piscataquis River, where, along the banks, or in the neighboring woods and swamps, he will find at different seasons many good things, among them *Anemone riparia*, *Fpilobium palustre*, *Frigeron hyssopifolius*, *Antennaria petaloidea*, *Senecio Balsamitae*, *Vaccinium caespitosum*, *Pyrola asarifolia*, *Primula mistassinica*, *Calypso*, *Allium Schoenoprasum*, *Carex deflexa* and *Lycopodium sabinaefolium*.

If he wants the rare **CALAMAGROSTIS NEMORALIS** he should visit the Chocorua-like peak of Boarstone Mt., on Lake Onawa (reached from Monson).

When he reaches Moosehead and Mt. Kineo he will naturally want to

get **CAREX PORTERI**, *C. saxatilis*, var. *miliaris*, and *C. Grahami* from the gravelly shores or low woods; and on Kineo he will look for *Draba incana*, var. *arabisans*, *Primula farinosa*, *Shepherdia canadensis*, *Carex capillaris*, and *Aspidium fragrans*.

In the Katahdin Iron Works region, too, the botanist will be very happy, but the great botanizing begins as he approaches southern Aroostook County. From the main line of the railroad beyond the Katahdin Iron Works district one has some splendid views of Mt. Katahdin itself with the neighboring masses of Sordnahunk and Traveller Mts. If one does not make up his mind at once to explore the giant amphitheatres and castellated ridges of Katahdin, he is no true lover of the best of botanical exploring and of inspiring mountain life. (For detailed account of Katahdin and its flora, as far as known, see RHODORA for June, 1901.)

At Crystal flag-station one should stop long enough to explore a bit of the great bog which furnishes the upper waters of Molunkus Stream. Following the railroad back half a mile he will find himself surrounded by masses of *Betula pumila*, *Lonicera oblongifolia*, and other northern shrubs, with an herbaceous flora including *Parnassia caroliniana*, **DROSERA LINEARIS**, *Valeriana sylvatica*, *Aster junceus*, *Pyrola rotundifolia*, var. *uliginosa*, *Tofieldia glutinosa*, *Carex chordorhiza* and *C. livida*.

If he wishes to stop for some time in the region (and who does not) he can have good accommodations at Island Falls; and there, near the Mattawamkeag River, he will get the local **ANTENNARIA RUPICOLA**, *Hieracium vulgatum*, *Frigeron acris*, and *Halenia deflexa*. In the river, itself, and in Mattawamkeag Lake he will revel in September, dragging up such prizes as *Myriophyllum Farwellii*, *M. alterniflorum*, and *Potamogeton obtusifolius*.

When Houlton is reached one should make up his mind to stop at some of the numerous villages between there and the Aroostook River, for the Cedar (Arbor-vitae) swamps of the Meduxnakeag and the Presque Isle valleys are the homes of *Cypripedium spectabile*, *Microstylis monophyllos*, *Carex vaginata*, and scores of other species of absorbing interest.

The valleys of the Aroostook and the main St. John — for instance at Fort Fairfield, Van Buren, Fort Kent, and St. Francis — furnish one of the most striking floras of New England. There among other species one will get **THALICTRUM CONFINE** and **T. OCCIDENTALE**, **OXYTROPIS CAMPESTRIS**, var. **JOHANNENSIS**, *Hedysarum boreale*, **TANACETUM HURONENSE**, **PRENANTHES RACEMOSA** and **P. MAINENSIS**, *Gentiana Amarella*, var. *acuta*, **PEDICULARIS FURBISHIAE**, **SALIX GLAUCOPHYLLA** and **S. ADENOPHYLLA**, **GOODYERA MENZIESII**, *Juncus alpinus*, var. *insignis* and **J. TENUIS**, var. **WILLIAMSII**, *Triglochin palustre*, *Scirpus Clintonii*, **CAREX CRAWEI** and **C. BICOLOR**, *Equisetum palustre* and *E. variegatum*, and *Lycopodium sitchense*.

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